SEQUENCE LISTING

<110> Osteryoung, Katherine W.
Vitha, Stanislav
Koksharova, Olga A.
Gao, Hongo

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gaattggaga cgccgttcga agcaccggcg gttcttgtgg tgggacagca gaccgacggt 180

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cgggctgtgg aagctctagt ccgagcaaag atgcaacaca aagagttcat cattttatgc 600

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Asn Glu Leu His Ala Leu Ala Gln Glu Leu Glu Thr Pro Phe Glu Ala
35 40 45

Pro Ala Val Leu Val Val Gly Gln Gln Thr Asp Gly Lys Ser Ala Leu
50 55 60

Val Glu Ala Leu Met Gly Phe Gln Phe Asn His Val Gly Gly Gly Thr
65 70 75 80

Lys Thr Arg Arg Pro Ile Thr Leu His Met Lys Tyr Asp Pro Gln Cys
85 90 95

```
Gln Phe Pro Leu Cys His Leu Gly Ser Asp Asp Asp Pro Ser Val Ser
            100                 105                 110

Leu Pro Lys Ser Leu Ser Gln Ile Gln Ala Tyr Ile Glu Ala Glu Asn
        115                 120                 125

Met Arg Leu Glu Gln Glu Pro Cys Ser Pro Phe Ser Ala Lys Glu Ile
    130                 135                 140

Ile Val Lys Val Gln Tyr Lys Tyr Cys Pro Asn Leu Thr Ile Ile Asp
145                 150                 155                 160

Thr Pro Gly Leu Ile Ala Pro Ala Pro Gly Leu Lys Asn Arg Ala Leu
                165                 170                 175

Gln Val Gln Ala Arg Ala Val Glu Ala Leu Val Arg Ala Lys Met Gln
            180                 185                 190

His Lys Glu Phe Ile Ile Leu Cys Leu Glu Asp Ser Ser Asp Trp Ser
        195                 200                 205

Ile Ala Thr Thr Arg Arg Ile Val Met Gln Val Asp Pro Glu Leu Ser
    210                 215                 220

Arg Thr Ile Val Val Ser Thr Lys Leu Asp Thr Lys Ile Pro Gln Phe
225                 230                 235                 240

Ser Cys Ser Ser Asp Val Glu Val Phe Leu Ser Pro Pro Ala Ser Ala
                245                 250                 255

Leu Asp Ser Ser Leu Leu Gly Asp Ser Pro Phe Phe Thr Ser Val Pro
            260                 265                 270

Ser Gly Arg Val Gly Tyr Gly Gln Asp Ser Val Tyr Lys Ser Asn Asp
        275                 280                 285

Glu Phe Lys Gln Ala Val Ser Leu Arg Glu Met Glu Asp Ile Ala Ser
    290                 295                 300

Leu Glu Lys Lys Leu Gly Arg Leu Leu Thr Lys Gln Glu Lys Ser Arg
305                 310                 315                 320

Ile Gly Ile Ser Lys Leu Arg Leu Phe Leu Glu Glu Leu Leu Trp Lys
                325                 330                 335
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Arg Tyr Lys Glu Ser Val Pro Leu Ile Ile Pro Leu Leu Gly Lys Glu
            340                 345                 350

Tyr Arg Ser Thr Val Arg Lys Leu Asp Thr Leu Ser Leu Leu Leu Lys
        355                 360                 365

Gly Thr Val Val Ala Pro Pro Asp Lys Phe Gly Glu Thr Leu Gln Asp
    370                 375                 380

Glu Arg Thr Gln Gly Gly Ala Phe Val Gly Thr Asp Gly Leu Gln Phe
385                 390                 395                 400

Ser His Lys Leu Ile Pro Asn Ala Gly Met Arg Leu Tyr Gly Gly Ala
                405                 410                 415

Gln Tyr His Arg Ala Met Ala Glu Phe Arg Phe Leu Val Gly Ala Ile
            420                 425                 430

Lys Cys Pro Pro Ile Thr Arg Glu Glu Ile Val Asn Ala Cys Gly Val
        435                 440                 445

Glu Asp Ile His Asp Gly Thr Asn Tyr Ser Arg Thr Ala Cys Val Ile
    450                 455                 460

Ala Val Ala Lys Ala Arg Glu Thr Phe Glu Pro Phe Leu His Gln Lys
465                 470                 475                 480

Val Phe Ser Ser Ser His Phe Arg Leu Phe Cys Val Asp Ile Val Arg
                485                 490                 495

Gly Glu Ala Ser Thr His Ser Gln Glu Ile Ala Ser Asn Phe Cys Ile
            500                 505                 510

Ser Ser Ser Gly Arg Tyr Cys Phe Leu Trp Phe Asp Gly Glu Tyr Leu
        515                 520                 525

Ser Gly His Glu Val Phe Leu Lys Arg Val Ala Ser Ala Phe Asn Ser
    530                 535                 540

Phe Val Glu Ser Thr Glu Lys Ser Cys Arg Asp Lys Cys Met Glu Asp
545                 550                 555                 560
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```
Leu Ala Ser Thr Thr Arg Tyr Val Thr Trp Ser Leu His Asn Lys Asn
                565                 570                 575

Arg Ala Gly Leu Arg Gln Phe Leu Asp Ser Phe Gly Gly Thr Glu His
            580                 585                 590

Asn Thr Thr Ser Gly Asn Ala Ile Gly Phe Ser Leu Pro Gln Asp Ala
        595                 600                 605

Leu Gly Gly Thr Thr Asp Thr Lys Ser Arg Ser Asp Val Lys Leu Ser
    610                 615                 620

His Leu Ala Ser Asn Ile Asp Ser Gly Ser Ser Ile Gln Thr Thr Glu
625                 630                 635                 640

Met Arg Leu Ala Asp Leu Leu Asp Ser Thr Leu Trp Asn Arg Lys Leu
                645                 650                 655

Ala Pro Ser Ser Glu Arg Ile Val Tyr Ala Leu Val Gln Gln Ile Phe
            660                 665                 670

Gln Gly Ile Arg Glu Tyr Phe Leu Ala Ser Ala Glu Leu Lys Phe Asn
        675                 680                 685

Cys Phe Leu Leu Met Pro Ile Val Asp Lys Leu Pro Ala Leu Leu Arg
    690                 695                 700

Glu Glu Leu Glu Asn Ala Phe Glu Asp Asp Leu Asp Ser Ile Phe Asp
705                 710                 715                 720

Ile Thr Asn Leu Arg Gln Ser Leu Asp Gln Lys Lys Arg Ser Thr Glu
                725                 730                 735

Ile Glu Leu Arg Arg Ile Lys Arg Ile Lys Glu Lys Phe Arg Val Met
            740                 745                 750

Asn Glu Lys Leu Asn Ser His Glu Phe Ala Gln Asn Leu Lys Ala Pro
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Ser Val Gln His
    770
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20 25 30

Ser Lys Met Gln Ser His Ser Lys Asp Pro Ile Asn Ala Glu Ser Arg
35 40 45

Ser Arg Phe Glu Ala Tyr Asn Arg Leu Gln Ala Ala Ala Val Ala Phe
50 55 60

Gly Glu Lys Leu Pro Ile Pro Glu Ile Val Ala Ile Gly Gly Gln Ser
65 70 75 80

Asp Gly Lys Ser Ser Leu Leu Glu Ala Leu Leu Gly Phe Arg Phe Asn
85 90 95

Val Arg Glu Val Glu Met Gly Thr Arg Arg Pro Leu Ile Leu Gln Met
100 105 110

Val His Asp Leu Ser Ala Leu Glu Pro Arg Cys Arg Phe Gln Ile Ser
115 120 125

Arg Ile Phe Phe Val Glu Leu Ala Ile Leu Ile Thr Asp Leu Asp Glu
130 135 140

Asp Ser Glu Glu Tyr Gly Ser Pro Ile Val Ser Ala Thr Ala Val Ala
145 150 155 160

Asp Val Ile Arg Ser Arg Thr Glu Ala Leu Leu Lys Lys Thr Lys Thr
165 170 175

Ala Val Ser Pro Lys Pro Ile Val Met Arg Ala Glu Tyr Ala His Cys
180 185 190

Pro Asn Leu Thr Ile Ile Asp Thr Pro Gly Phe Val Leu Lys Ala Lys
195 200 205

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Lys Gly Glu Pro Glu Thr Thr Pro Asp Glu Ile Leu Ser Met Val Lys
    210                 215                 220

Ser Leu Ala Ser Pro Pro His Arg Ile Leu Leu Phe Leu Gln Gln Ser
225                 230                 235                 240

Ser Val Glu Trp Cys Ser Ser Leu Trp Leu Asp Ala Val Arg Glu Ile
                245                 250                 255

Asp Ser Ser Phe Arg Arg Thr Ile Val Val Val Ser Lys Phe Asp Asn
            260                 265                 270

Arg Leu Lys Glu Phe Ser Asp Arg Gly Glu Val Asp Arg Tyr Leu Ser
        275                 280                 285

Ala Ser Gly Tyr Leu Gly Glu Asn Thr Arg Pro Tyr Phe Val Ala Leu
    290                 295                 300

Pro Lys Asp Arg Ser Thr Ile Ser Asn Asp Glu Phe Arg Arg Gln Ile
305                 310                 315                 320

Ser Gln Val Asp Thr Glu Val Ile Arg His Leu Arg Glu Gly Val Lys
                325                 330                 335

Gly Gly Phe Asp Glu Glu Lys Phe Arg Ser Cys Ile Gly Phe Gly Ser
            340                 345                 350

Leu Arg Asp Phe Leu Glu Ser Glu Leu Gln Lys Arg Tyr Lys Glu Ala
        355                 360                 365

Ala Pro Ala Thr Leu Ala Leu Leu Glu Glu Arg Cys Ser Glu Val Thr
    370                 375                 380

Asp Asp Met Leu Arg Met Asp Met Lys Ile Gln Ala Thr Ser Asp Val
385                 390                 395                 400

Ala His Leu Arg Lys Ala Ala Met Leu Tyr Thr Ala Ser Ile Ser Asn
                405                 410                 415
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His Val Gly Ala Leu Ile Asp Gly Ala Ala Asn Pro Ala Pro Glu Gln
            420                 425                 430

Trp Gly Lys Thr Thr Glu Glu Glu Arg Gly Glu Ser Gly Ile Gly Ser
        435                 440                 445

Trp Pro Gly Val Ser Val Asp Ile Lys Pro Pro Asn Ala Val Leu Lys
    450                 455                 460

Leu Tyr Gly Gly Ala Ala Phe Glu Arg Val Ile His Glu Phe Arg Cys
465                 470                 475                 480

Ala Ala Tyr Ser Ile Glu Cys Pro Pro Val Ser Arg Glu Lys Val Ala
                485                 490                 495

Asn Ile Leu Leu Ala His Ala Gly Arg Gly Gly Gly Arg Gly Val Thr
            500                 505                 510

Glu Ala Ser Ala Glu Ile Ala Arg Thr Ala Ala Arg Ser Trp Leu Ala
        515                 520                 525

Pro Leu Leu Asp Thr Ala Cys Asp Arg Leu Ala Phe Val Leu Gly Ser
    530                 535                 540

Leu Phe Glu Ile Ala Leu Glu Arg Asn Leu Asn Gln Asn Ser Glu Tyr
545                 550                 555                 560

Glu Lys Lys Thr Glu Asn Met Asp Gly Tyr Val Gly Phe His Ala Ala
                565                 570                 575

Val Arg Asn Cys Tyr Ser Arg Phe Val Lys Asn Leu Ala Lys Gln Cys
            580                 585                 590

Lys Gln Leu Val Arg His His Leu Asp Ser Val Thr Ser Pro Tyr Ser
        595                 600                 605

Met Ala Cys Tyr Glu Asn Asn Tyr His Gln Gly Gly Ala Phe Gly Ala
    610                 615                 620

Tyr Asn Lys Phe Asn Gln Ala Ser Pro Asn Ser Phe Cys Phe Glu Leu
625                 630                 635                 640
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Ser Asp Thr Ser Arg Asp Glu Pro Met Lys Asp Gln Glu Asn Ile Pro
645 650 655

Pro Glu Lys Asn Asn Gly Gln Glu Thr Thr Pro Gly Lys Gly Gly Glu
660 665 670

Ser His Ile Thr Val Pro Glu Thr Pro Ser Pro Asp Gln Pro Cys Glu
675 680 685

Ile Val Tyr Gly Leu Val Lys Lys Glu Ile Gly Asn Gly Pro Asp Gly
690 695 700

Val Gly Ala Arg Lys Arg Met Ala Arg Met Val Gly Asn Arg Asn Ile
705 710 715 720

Glu Pro Phe Arg Val Gln Asn Gly Gly Leu Met Phe Ala Asn Ala Asp
725 730 735

Asn Gly Met Lys Ser Ser Ser Ala Tyr Ser Glu Ile Cys Ser Ser Ala
740 745 750

Ala Gln His Phe Ala Arg Ile Arg Glu Val Leu Val Glu Arg Ser Val
755 760 765

Thr Ser Thr Leu Asn Ser Gly Phe Leu Thr Pro Cys Arg Asp Arg Leu
770 775 780

Val Val Ala Leu Gly Leu Asp Leu Phe Ala Val Asn Asp Asp Lys Phe
785 790 795 800

Met Asp Met Phe Val Ala Pro Gly Ala Ile Val Val Leu Gln Asn Glu
805 810 815

Arg Gln Gln Leu Gln Lys Arg Gln Lys Ile Leu Gln Ser Cys Leu Thr
820 825 830

Glu Phe Lys Thr Val Ala Arg Ser Leu
835 840

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Ser Arg Arg Asn Gln Gln Ser Gln Ser Lys Met Gln Ser His Ser Lys
            20                  25                  30

Asp Pro Ile Asn Ala Glu Ser Arg Ser Arg Phe Glu Ala Tyr Asn Arg
        35                  40                  45

Leu Gln Ala Ala Ala Val Ala Phe Gly Glu Lys Leu Pro Ile Pro Glu
    50                  55                  60

Ile Val Ala Ile Gly Gly Gln Ser Asp Gly Lys Ser Ser Leu Leu Glu
65                  70                  75                  80

Ala Leu Leu Gly Phe Arg Phe Asn Val Arg Glu Val Glu Met Gly Thr
                85                  90                  95

Arg Arg Pro Leu Ile Leu Gln Met Val His Asp Leu Ser Ala Leu Glu
            100                 105                 110

Pro Arg Cys Arg Phe Gln Asp Glu Asp Ser Glu Glu Tyr Gly Ser Pro
        115                 120                 125

Ile Val Ser Ala Thr Ala Val Ala Asp Val Ile Arg Ser Arg Thr Glu
    130                 135                 140

Ala Leu Leu Lys Lys Thr Lys Thr Ala Val Ser Pro Lys Pro Ile Val
145                 150                 155                 160

Met Arg Ala Glu Tyr Ala His Cys Pro Asn Leu Thr Ile Ile Asp Thr
                165                 170                 175

Pro Gly Phe Val Leu Lys Ala Lys Lys Gly Glu Pro Glu Thr Thr Pro
            180                 185                 190

Asp Glu Ile Leu Ser Met Val Lys Ser Leu Ala Ser Pro Pro His Arg
        195                 200                 205

Ile Leu Leu Phe Leu Gln Gln Ser Ser Val Glu Trp Cys Ser Ser Leu
    210                 215                 220
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Trp Leu Asp Ala Val Arg Glu Ile Asp Ser Ser Phe Arg Arg Thr Ile
225                 230                 235                 240

Val Val Val Ser Lys Phe Asp Asn Arg Leu Lys Glu Phe Ser Asp Arg
                245                 250                 255

Gly Glu Val Asp Arg Tyr Leu Ser Ala Ser Gly Tyr Leu Gly Glu Asn
            260                 265                 270

Thr Arg Pro Tyr Phe Val Ala Leu Pro Lys Asp Arg Ser Thr Ile Ser
        275                 280                 285

Asn Asp Glu Phe Arg Arg Gln Ile Ser Gln Val Asp Thr Glu Val Ile
    290                 295                 300

Arg His Leu Arg Glu Gly Val Lys Gly Gly Phe Asp Glu Glu Lys Phe
305                 310                 315                 320

Arg Ser Cys Ile Gly Phe Gly Ser Leu Arg Asp Phe Leu Glu Ser Glu
                325                 330                 335

Leu Gln Lys Arg Tyr Lys Glu Ala Ala Pro Ala Thr Leu Ala Leu Leu
            340                 345                 350

Glu Glu Arg Cys Ser Glu Val Thr Asp Asp Met Leu Arg Met Asp Met
        355                 360                 365

Lys Ile Gln Ala Thr Ser Asp Val Ala His Leu Arg Lys Ala Ala Met
    370                 375                 380

Leu Tyr Thr Ala Ser Ile Ser Asn His Val Gly Ala Leu Ile Asp Gly
385                 390                 395                 400

Ala Ala Asn Pro Ala Pro Glu Gln Trp Gly Lys Thr Thr Glu Glu Glu
                405                 410                 415

Arg Gly Glu Ser Gly Ile Gly Ser Trp Pro Gly Val Ser Val Asp Ile
            420                 425                 430

Lys Pro Pro Asn Ala Val Leu Lys Leu Tyr Gly Gly Ala Ala Phe Glu
        435                 440                 445

Arg Val Ile His Glu Phe Arg Cys Ala Ala Tyr Ser Ile Glu Cys Pro
    450                 455                 460
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Pro Val Ser Arg Glu Lys Val Ala Asn Ile Leu Leu Ala His Ala Gly
465                 470                 475                 480

Arg Gly Gly Gly Arg Gly Val Thr Glu Ala Ser Ala Glu Ile Ala Arg
                485                 490                 495

Thr Ala Ala Arg Ser Trp Leu Ala Pro Leu Leu Asp Thr Ala Cys Asp
            500                 505                 510

Arg Leu Ala Phe Val Leu Gly Ser Leu Phe Glu Ile Ala Leu Glu Arg
        515                 520                 525

Asn Leu Asn Gln Asn Ser Glu Tyr Glu Lys Lys Thr Glu Asn Met Asp
    530                 535                 540

Gly Tyr Val Gly Phe His Ala Ala Val Arg Asn Cys Tyr Ser Arg Phe
545                 550                 555                 560

Val Lys Asn Leu Ala Lys Gln Cys Lys Gln Leu Val Arg His His Leu
                565                 570                 575

Asp Ser Val Thr Ser Pro Tyr Ser Met Ala Cys Tyr Glu Asn Asn Tyr
            580                 585                 590

His Gln Gly Gly Ala Phe Gly Ala Tyr Asn Lys Phe Asn Gln Ala Ser
        595                 600                 605

Pro Asn Ser Phe Cys Phe Glu Leu Ser Asp Thr Ser Arg Asp Glu Pro
    610                 615                 620

Met Lys Asp Gln Glu Asn Ile Pro Pro Glu Lys Asn Asn Gly Gln Glu
625                 630                 635                 640

Thr Thr Pro Gly Lys Gly Gly Glu Ser His Ile Thr Val Pro Glu Thr
                645                 650                 655

Pro Ser Pro Asp Gln Pro Cys Glu Ile Val Tyr Gly Leu Val Lys Lys
            660                 665                 670

Glu Ile Gly Asn Gly Pro Asp Gly Val Gly Ala Arg Lys Arg Met Ala
        675                 680                 685
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Arg Met Val Gly Asn Arg Asn Ile Glu Pro Phe Arg Val Gln Asn Gly
    690                 695                 700

Gly Leu Met Phe Ala Asn Ala Asp Asn Gly Met Lys Ser Ser Ser Ala
705                 710                 715                 720

Tyr Ser Glu Ile Cys Ser Ser Ala Ala Gln His Phe Ala Arg Ile Arg
                725                 730                 735

Glu Val Leu Val Glu Arg Ser Val Thr Ser Thr Leu Asn Ser Gly Phe
            740                 745                 750

Leu Thr Pro Cys Arg Asp Arg Leu Val Val Ala Leu Gly Leu Asp Leu
        755                 760                 765

Phe Ala Val Asn Asp Asp Lys Phe Met Asp Met Phe Val Ala Pro Gly
    770                 775                 780

Ala Ile Val Val Leu Gln Asn Glu Arg Gln Gln Leu Gln Lys Arg Gln
785                 790                 795                 800

Lys Ile Leu Gln Ser Cys Leu Thr Glu Phe Lys Thr Val Ala Arg Ser
                805                 810                 815

Leu
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ttcttgaaac attttaaagt ttcaattctt taaaataata aatccgagta aaatcagata 6120

actattttaa ttttggacgc ttgataaatc aagcttcctg ctcattcgta atcagaatca 6180

ttttggtcct tttataatat gggtctgaac cattgtccaa tttttctaag cgatgtggga 6240

cattgtacac atattatttc ttcataggtt gaataatata tgtccgttta aaaaactttg 6300

aattacatca tattcagaaa aaaatataat attttattaa ctatatatat tttatataaa 6360

ttcaaaataa ataaagtata agatcaaata aaaatgaaag 6400

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<400> 28

Met Glu Ala Leu Ser His Val Gly Ile Gly Leu Ser Pro Phe Gln Leu
1 5 10 15

Cys Arg Leu Pro Pro Ala Thr Thr Lys Leu Arg Arg Ser His
20 25 30

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ccgaattctc tgtgttggcg 20

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aagcttcgta cagaccctgc tgac 24

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ggtaagttga cggtcaag 18

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cgatagggcc gtagctgtc 19

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ggttaacttg tgatcgaac 19

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gcagccagtc tgccctag 18

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gcgcagtcct ttcttgagg 19

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<400> 38
ctgaccggtg aggttctgc 19

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<400> 39
ccaggaatcg ctgaacattc 20

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gcgatcgcgg tagctttcgg 20

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<400> 41
ctaggcagtg tacgttc 17

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<400> 42
ccgaattcgt gacctctacc cgtactgc 28

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ccaagcttcg ttttataaag gcgctcag 28

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ctgctcgtga gcaatttgc 19

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ccgttctgaa aggctc 16

<210> 46
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<400> 46
cagtgaattg taatac 16

<210> 47
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<400> 47
gaaatagcca tcgcgagc 18

<210> 48
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<400> 48
ccgaattcgt ggcagtggaa aatcgtggg 29

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ccgaattcca cttgcacgat tgggatc 27

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ccgaattcgc cctactcatt aactatag 28

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<400> 51
ccgaattccg gagcgatcgc ttgtttg 27

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gattaatgag actatatatg agag 24

<210> 53
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<400> 53
atctgcataa cttcaattga actg 24

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<400> 54
gaacccccag aatatcaaca tc 22

<210> 55
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<400> 55
gctctgatgg tgattctggt aac 23

<210> 56
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<400> 56
gtagcattct ttagagattg atctag 26

<210> 57
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<400> 57
tattcgagtt tgaaattatg atttatgc 28

<210> 58
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<400> 58
gctacagttc tcaaccggta aatc 24

<210> 59
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<400> 59
cataagcttt tatgctccaa aatagtctc 29

<210> 60
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<220>
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<400> 60
cttgatcttg tgttctgaca tctc 24

<210> 61
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<400> 61
ctaaactatt cacaaatgcc atagacg 27

<210> 62
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<400> 62
agccgtcttg tcccatcatt aaag 24

<210> 63
<211> 26
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<400> 63
gcacaaacaa acagggtcaa tagtta 26

<210> 64
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ttaaagtgaa gcttaagcag agg 23

<210> 65
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<400> 65
cattgttaga aagtcaacac tttg 24

<210> 66
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<400> 66
gcaagacata accaatgaac aag 23

<210> 67
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<400> 67
gacacgtatg cgtttctaag ag 22

<210> 68
<211> 24
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<220>
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<400> 68
ctccaacttc aagcaaaacg gatg 24

<210> 69
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<400> 69
ctctgttttt tgggctagtg atgg 24

<210> 70
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gcatacccaa tatcctttgt gc 22

<210> 71
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<400> 71
gatagtataa ccagaggttg gag 23

<210> 72
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<400> 72
gaatcttctc aaactgaaat ccacc 25

<210> 73
<211> 22
<212> DNA
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<220>
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<400> 73
tcgaaaggaa gatcggtgaa cc 22

<210> 74
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<400> 74
gattgtgcta tggttcagga gttc 24

<210> 75
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<400> 75
catcagctat aacctcctca gtg 23

<210> 76
<211> 24
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<220>
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<400> 76
actgactata aggacccctc aaac 24

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<400> 77
gttgaccata attcatccac cactatta 28

<210> 78
<211> 27
<212> DNA
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<400> 78
ggaattccga gtcgagttgc tttgttg 27

<210> 79
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<212> DNA
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<220>
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<400> 79
cgtctagagc ttacctcaaa ggtacatgga 30

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<400> 80
cgggatccat gagtaaagga gaagaact 28

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<400> 81
gctctagata gttcatccat gccatgt 27

<210> 82
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<220>
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<400> 82
ggactagtac gatggcggaa gtatcagc 28

<210> 83
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<212> DNA
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<220>
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<400> 83
cgggatccgc accgaaggag cctttagatt 30

<210> 84
<211> 27
<212> DNA
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<220>
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<400> 84
gactagttgg ctcaacgctt acctcaa 27

<210> 85
<211> 25
<212> DNA
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<220>
<223> Synthetic

<400> 85
cgggatccgc catcgtctct tacga 25

<210> 86
<211> 61
<212> PRT
<213> Arabidopsis thaliana

<400> 86

Asp Pro Tyr Lys Thr Leu Lys Ile Arg Pro Asp Ser Ser Glu Tyr Glu
1 5 10 15

Val Lys Lys Ala Phe Arg Gln Leu Ala Lys Lys Tyr His Pro Asp Val
20 25 30

Cys Arg Gly Ser Asn Cys Gly Val Gln Phe Gln Thr Ile Asn Glu Ala
35 40 45

Tyr Asp Ile Val Leu Lys Gln Ile Lys Asn Gln Met Glu
50 55 60

<210> 87
<211> 68
<212> PRT
<213> Phaseolus vulgaris

<400> 87

Ser Leu Tyr Asp Ile Leu Gly Ile Pro Ala Gly Ala Ser Ser Gln Glu
1 5 10 15

Ile Lys Ala Ala Tyr Arg Arg Leu Ala Arg Val Cys His Pro Asp Val
20 25 30

Ala Ala Ile Asp Arg Lys Asn Ser Ser Ala Asp Glu Phe Met Lys Ile
35 40 45

His Ala Ala Tyr Ser Thr Leu Ser Asp Pro Asp Lys Arg Ala Asn Tyr
50 55 60

Asp Arg Ser Leu
65

<210> 88
<211> 68
<212> PRT
<213> Arabidopsis thaliana

<400> 88

Ser Leu Tyr Glu Ile Leu Glu Ile Pro Val Gly Ser Thr Ser Gln Glu
1 5 10 15

Ile Lys Ser Ala Tyr Arg Arg Leu Ala Arg Ile Cys His Pro Asp Val
20 25 30

Ala Arg Asn Ser Arg Asp Asn Ser Ser Ala Asp Asp Phe Met Lys Ile
35 40 45

His Ala Ala Tyr Cys Thr Leu Ser Asp Pro Glu Lys Arg Ala Val Tyr
50 55 60

Asp Arg Arg Thr
65

<210> 89
<211> 63
<212> PRT
<213> Mycoplasma pneumoniae

<400> 89

Thr Leu Tyr Asp Leu Leu Glu Leu Pro Gln Thr Ala Thr Leu Gln Glu
1 5 10 15

Ile Lys Thr Ala Tyr Lys Arg Leu Ala Lys Arg Tyr His Pro Asp Ile
20 25 30

Asn Lys Gln Gly Ala Asp Thr Phe Val Lys Ile Asn Asn Ala Tyr Ala
35 40 45

Val Leu Ser Asp Thr Thr Gln Lys Ala Glu Tyr Asp Ala Met Leu
50 55 60

<210> 90
<211> 63
<212> PRT
<213> Mycoplasma genitalium

<400> 90

Asn Leu Tyr Asp Leu Leu Glu Leu Pro Thr Thr Ala Ser Ile Lys Glu
1 5 10 15

Ile Lys Ile Ala Tyr Lys Arg Leu Ala Lys Arg Tyr His Pro Asp Val
20 25 30

Asn Lys Leu Gly Ser Gln Thr Phe Val Glu Ile Asn Asn Ala Tyr Ser
35 40 45

Ile Leu Ser Asp Pro Asn Gln Lys Glu Lys Tyr Asp Ser Met Leu
50 55 60

<210> 91
<211> 68
<212> PRT
<213> Arabidopsis thaliana

<400> 91

Ser Phe Tyr Asp Leu Leu Gly Val Thr Glu Ser Val Thr Leu Pro Glu
1 5 10 15

Ile Lys Gln Ala Tyr Lys Gln Leu Ala Arg Lys Tyr His Pro Asp Val
20 25 30

Ser Pro Pro Asp Arg Val Glu Glu Tyr Thr Asp Arg Phe Ile Arg Val
35 40 45

Gln Glu Ala Tyr Glu Thr Leu Ser Asp Pro Arg Arg Arg Val Leu Tyr
50 55 60

Asp Arg Asp Leu
65

<210> 92
<211> 69
<212> PRT
<213> Drosophila melanogaster

<400> 92

Asn Cys Tyr Asp Val Leu Gly Val Thr Arg Glu Ser Ser Lys Ser Glu
1 5 10 15

Ile Gly Lys Ala Tyr Arg Gln Leu Ala Arg Arg Tyr His Pro Asp Leu
20 25 30

His Arg Gly Ala Glu Ala Lys Ala Ala Ala Glu Thr Gln Phe Lys Leu
35 40 45

Val Ala Thr Ala Tyr Glu Ile Leu Arg Asp Glu Glu Ser Arg Thr Asp
50 55 60

Tyr Asp Tyr Met Leu
65

<210> 93
<211> 70
<212> PRT
<213> Caenorhabditis elegans

<400> 93

Asn Cys Tyr Asp Val Leu Glu Val Asn Arg Glu Glu Phe Asp Lys Gln
1 5 10 15

Lys Leu Ala Lys Ala Tyr Arg Ala Leu Ala Arg Lys His His Pro Asp
20 25 30

Arg Val Lys Asn Lys Glu Glu Lys Leu Leu Ala Glu Glu Arg Phe Arg
35 40 45

Val Ile Ala Thr Ala Tyr Glu Thr Leu Lys Asp Asp Glu Ala Lys Thr
50 55 60

Asn Tyr Asp Tyr Tyr Leu
65 70

<210> 94
<211> 72
<212> PRT
<213> Arabidopsis thaliana

<400> 94

Ser Pro Tyr Asp Thr Leu Glu Leu Asp Arg Asn Ala Glu Glu Glu Gln
1 5 10 15

Ile Lys Val Ala Tyr Arg Arg Leu Ala Lys Phe Tyr His Pro Asp Val
20 25 30

Tyr Asp Gly Lys Gly Thr Leu Glu Glu Gly Glu Thr Ala Glu Ala Arg
35 40 45

Phe Ile Lys Ile Gln Ala Ala Tyr Glu Leu Leu Met Asp Ser Glu Lys
50 55 60

Lys Val Gln Tyr Asp Met Asp Asn
65 70

<210> 95
<211> 68
<212> PRT
<213> Schizosaccharomyces pombe

<400> 95

Lys Leu Tyr Asp Ile Leu Glu Val His Phe Glu Ala Ser Ala Glu Glu
1 5 10 15

Ile Lys Lys Ser Tyr Lys Arg Leu Ala Leu Leu His His Pro Asp Lys
20 25 30

Ala Pro Ile His Glu Lys Glu Glu Ala Ala Glu Arg Phe Arg Gly Val
35 40 45

Gln Glu Ala Tyr Asp Ile Leu Lys Asp Pro Glu Ser Arg Glu Met Tyr
50 55 60

Asp Met Tyr Gly
65

<210> 96
<211> 66
<212> PRT
<213> Unknown

<220>
<223> Synthetic

<400> 96

Asp Phe Tyr Lys Ile Leu Gly Ala Glu Pro His Phe Leu Gly Asp Gly
1 5 10 15

Ile Arg Arg Ala Phe Glu Ser Arg Ile Ala Lys Pro Pro Gln Tyr Gly
20 25 30

Tyr Ser Thr Glu Ala Leu Ala Gly Arg Arg Gln Met Leu Gln Ile Ala
35 40 45

His Asp Thr Leu Thr Asn Gln Ser Ser Arg Thr Glu Tyr Asp Arg Ala
50 55 60

Leu Ser
65

<210> 97
<211> 66
<212> PRT
<213> Oryza sativa

<400> 97

Asp Phe Tyr Lys Val Leu Gly Ala Glu Pro His Phe Leu Gly Asp Gly
1 5 10 15

Ile Arg Arg Ala Phe Glu Ala Arg Ile Ala Lys Pro Pro Gln Tyr Gly
20 25 30

Tyr Ser Thr Asp Ala Leu Val Gly Arg Arg Gln Met Leu Gln Ile Ala
35 40 45

His Asp Thr Leu Met Asn Gln Asn Ser Arg Thr Gln Tyr Asp Arg Ala
50 55 60

Leu Ser
65

<210> 98
<211> 66
<212> PRT
<213> Solanum tuberosum

<400> 98

Asp Phe Tyr Arg Val Leu Gly Ala Glu Ala His Phe Leu Gly Asp Gly
1 5 10 15

Ile Arg Arg Cys Tyr Asp Ala Arg Ile Thr Lys Pro Pro Gln Tyr Gly
20 25 30

Tyr Ser Gln Glu Ala Leu Ile Gly Arg Arg Gln Ile Leu Gln Ala Ala
35 40 45

Cys Glu Thr Leu Ala Asp Ser Thr Ser Arg Arg Glu Tyr Asn Gln Gly
50 55 60

Leu Ala
65

<210> 99
<211> 66
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 99

Asp Leu Tyr Lys Ile Leu Gly Ala Glu Thr His Phe Leu Gly Asp Gly
1 5 10 15

Ile Arg Arg Ala Tyr Glu Ala Lys Phe Ser Lys Pro Pro Gln Tyr Ala
20 25 30

Phe Ser Asn Glu Ala Leu Ile Ser Arg Arg Gln Ile Leu Gln Ala Ala
35 40 45

Cys Glu Thr Leu Ala Asp Pro Ala Ser Arg Arg Glu Tyr Asn Gln Ser
50 55 60

Leu Val
65

<210> 100
<211> 66
<212> PRT
<213> Arabidopsis thaliana

<400> 100

Asp Phe Tyr Gln Val Leu Gly Ala Gln Thr His Phe Leu Thr Asp Gly
1 5 10 15

Ile Arg Arg Ala Phe Glu Ala Arg Val Ser Lys Pro Pro Gln Phe Gly
20 25 30

Phe Ser Asp Asp Ala Leu Ile Ser Arg Arg Gln Ile Leu Gln Ala Ala
35 40 45

Cys Glu Thr Leu Ser Asn Pro Arg Ser Arg Arg Glu Tyr Asn Glu Gly
50 55 60

Leu Leu
65

<210> 101
<211> 66
<212> PRT
<213> Protochlorococcus marinus MED4

<400> 101

Asp His Phe Arg Leu Ile Gly Val Ser Pro Ser Ala Thr Ser Glu Glu
1 5 10 15

Ile Leu Arg Ala Phe Gln Leu Arg Leu Asp Lys Thr Pro Asp Glu Gly
20 25 30

Phe Thr Tyr Glu Val Leu Thr Gln Arg Ser Glu Leu Leu Arg Leu Thr
35 40 45

Ala Asp Leu Leu Thr Asp Pro Asp Ser Arg Arg Asp Tyr Glu Asn Leu
50 55 60

Leu Leu
65

<210> 102
<211> 66
<212> PRT
<213> Protochlorococcus marinus MT9313

<400> 102

Asp His Phe Arg Leu Leu Gly Val Ser Pro Ser Ala Asp Ser Glu Ala
1 5 10 15

Ile Leu Arg Ala Leu Glu Leu Arg Leu Asp Arg Cys Pro Asp Gln Gly
20 25 30

Phe Thr His Glu Val Leu Ile Gln Arg Ala Glu Leu Leu Arg Leu Ser
35 40 45

Ala Asp Leu Leu Thr Asp Pro Pro Arg Arg Gln Ala Tyr Glu Thr Ala
50 55 60

Leu Leu
65

<210> 103
<211> 66
<212> PRT
<213> Synechocystis PCC6803

<400> 103

Asp His Phe Arg Leu Leu Gly Val Ser Pro Ser Ala Asp Pro Ala Ser
1 5 10 15

Ile Leu Arg Arg Leu Gln Thr Arg Ser Asp Ser Pro Pro Asp Asp Gly
20 25 30

Phe Thr His Glu Gly Leu Leu Gln Arg Gln Ala Leu Leu His Arg Ser
35 40 45

Ala Asp Leu Leu Thr Asp Pro Ser Glu Arg Ala Asp Tyr Glu Ala Ala
50 55 60

Leu Leu
65

<210> 104
<211> 66
<212> PRT
<213> Synechocystis PCC6803

<400> 104

Asp Phe Tyr Arg Ile Leu Gly Ile Pro Pro Gln Ser Gly Gly Glu Thr
1 5 10 15

Ile Glu Gln Ala Tyr Gln Asp Arg Leu Leu Gln Leu Pro Arg Arg Glu
20 25 30

Phe Ser Asp Ala Ala Val Thr Leu Arg Asn Gln Leu Leu Ala Ile Ala
35 40 45

Tyr Glu Thr Leu Arg Asp Pro Glu Lys Arg Gln Ala Tyr Asp Gln Glu
50 55 60

Trp Trp
65

<210> 105
<211> 66
<212> PRT
<213> Nostoc punctiforme

<400> 105

Asp Tyr Tyr Arg Ile Leu Gly Leu Pro Leu Ala Ala Ser Glu Glu Gln
1 5 10 15

Leu Arg Gln Ala Tyr Ser Asp Arg Ile Val Gln Leu Pro Arg Arg Glu
20 25 30

Tyr Ser Gln Ala Ala Ile Ser Ser Arg Lys Gln Leu Ile Glu Glu Ala
35 40 45

Tyr Val Val Leu Ser Asp Pro Lys Gln Arg Ser Thr Tyr Asp Gln Leu
50 55 60

Tyr Leu
65

<210> 106
<211> 66
<212> PRT
<213> Anabaena PCC7120

<400> 106

Asp Tyr Tyr Arg Ile Leu Gly Leu Pro Leu Ala Ala Ser Asp Glu Gln
1 5 10 15

Leu Arg Gln Ala Tyr Ser Asp Arg Ile Val Gln Leu Pro Arg Arg Glu
20 25 30

Tyr Ser Gln Ala Ala Ile Ala Ser Arg Lys Gln Leu Ile Glu Glu Ala
35 40 45

Tyr Val Val Leu Ser Asp Pro Lys Glu Arg Ser Ser Tyr Asp Gln Leu
50 55 60

Tyr Leu
65

<210> 107
<211> 66
<212> PRT
<213> Bombyx mori

<400> 107

Asp Tyr Tyr Ala Leu Leu Gly Cys Asp Glu Asn Ser Thr Val Glu Gln
1 5 10 15

Ile Thr Ala Glu Tyr Lys Ile Leu Ala Leu Gln His His Pro Asp Lys
20 25 30

Asn Asp Gly Glu Lys Glu Ala Glu Met Lys Phe Gln Lys Leu Lys Glu
35 40 45

Ala Lys Glu Ile Leu Cys Asp Pro Ser Lys Arg Ala Leu Tyr Asp Lys
50 55 60

Trp Arg
65

<210> 108
<211> 66
<212> PRT
<213> Drosophila melanogaster

<400> 108

Asp Phe Tyr Gly Leu Leu His Cys Asp Glu Asn Ser Ser Pro Glu Gln
1 5 10 15

Ile Gln Ala Glu Tyr Lys Val Leu Ala Leu Gln Tyr His Pro Asp Lys
20 25 30

Asn Ser Gly Asp Lys Glu Ala Glu Ala Lys Phe Gln Gln Leu Lys Glu
35 40 45

Ala Lys Glu Thr Leu Cys Asp Pro Glu Lys Arg Ala Ile Tyr Asp Lys
50 55 60

Trp Arg
65

<210> 109
<211> 66
<212> PRT
<213> Mus musculus

<400> 109

Asp Tyr Tyr Ala Leu Leu Gly Cys Asp Glu Leu Ser Ser Val Glu Gln
1 5 10 15

Ile Leu Ala Glu Phe Lys Ile Arg Ala Leu Glu Cys His Pro Asp Lys
20 25 30

His Pro Glu Asn Ser Lys Ala Val Glu Thr Phe Gln Lys Leu Gln Lys
35 40 45

Ala Lys Glu Ile Leu Cys Asn Ala Glu Ser Arg Ala Arg Tyr Asp His
50 55 60

Trp Arg
65

<210> 110
<211> 65
<212> PRT
<213> Saccharomyces cerevisiae

<400> 110

Asp Ala Tyr Ser Ile Leu Gly Val Pro Pro Asp Ser Ser Gln Glu Gln
1 5 10 15

Ile Arg Lys His Tyr Lys Lys Ile Ala Val Leu Val His Pro Asp Lys
20 25 30

Asn Lys Gln Ala Gly Ala Glu Glu Ala Phe Lys Val Leu Gln Arg Ala
35 40 45

Phe Glu Leu Ile Gly Glu Pro Glu Asn Arg Leu Ile Tyr Asp Gln Ser
50 55 60

Ile
65

<210> 111
<211> 64
<212> PRT
<213> Leishmania major

<400> 111

Glu Leu Tyr Gln Val Leu Glu Leu Asp Ala Gln Cys Thr Thr Ala Glu
1 5 10 15

Ile Ser Gln Gln Tyr Arg Arg Leu Ala Leu Arg Tyr His Pro Asp Arg
20 25 30

Asn Ala Gly Ala Thr Val Glu Gln Phe Gln Arg Ile Glu Glu Ala His
35 40 45

Arg Val Leu Ser Asp Leu Arg Gln Arg Gln Leu Tyr Asp Thr Val Gly
50 55 60

<210> 112
<211> 67
<212> PRT
<213> Schizosaccharomyces pombe

<400> 112

Asp Tyr Tyr Thr Ile Leu Gly Ala Glu Ser Thr Ser Ser Tyr Val Glu
1 5 10 15

Ile Arg Gln Gln Tyr Leu Lys Leu Val Leu Arg Tyr His Pro Asp Arg
20 25 30

Asn Pro Gly Arg Glu Ala Glu Val Leu Pro Gln Phe Gln Leu Ile Gln
35 40 45

Lys Ala His Glu Val Leu Lys Asp Pro Lys Leu Arg Glu Leu Phe Asp
50 55 60

Gln Arg Arg
65

<210> 113
<211> 67
<212> PRT
<213> Schizosaccharomyces pombe

<400> 113

Asp Tyr Tyr Ala Ile Leu Lys Leu Gln Lys Asn Ala Thr Phe Gln Gln
1 5 10 15

Ile Arg Lys Gln Tyr Leu Phe Leu Ala Leu Gln Tyr His Pro Asp Arg
20 25 30

Asn Pro Gly Asp Glu Glu Arg Ala Val Lys Arg Phe Gln Arg Leu Gln
35 40 45

Leu Ala His Glu Val Leu Ser Asp Ala Thr Lys Arg Leu Ile Tyr Asp
50 55 60

Gln Leu Phe
65

<210> 114
<211> 68
<212> PRT
<213> Schizosaccharomyces pombe

<400> 114

Asn His Tyr Ser Val Leu Asn Leu Lys Asp Gly Lys Thr Tyr Thr Asp
1 5 10 15

Asp Glu Ile Lys Glu Ala Tyr Arg Lys Ala Leu Leu Leu Phe His Pro
20 25 30

Asp Lys Cys Lys Glu Lys Pro Ser Val Val Tyr Thr Ile Asp Gln Val
35 40 45

Lys Glu Ala Tyr Gln Val Leu Ser Ser Glu Lys Asp Arg Gln Gln Tyr
50 55 60

Gln Ile Lys Gln
65

<210> 115
<211> 652
<212> PRT
<213> Anabaena PCC7120

<400> 115

Gln Gly Lys Tyr Ala Val Arg Ile Pro Leu Asp Tyr Tyr Arg Ile Leu
1 5 10 15

Gly Leu Pro Leu Ala Ala Ser Asp Glu Gln Leu Arg Gln Ala Tyr Ser
20 25 30

Asp Arg Ile Val Gln Leu Pro Arg Arg Glu Tyr Ser Gln Ala Ala Ile
35 40 45

Ala Ser Arg Lys Gln Leu Ile Glu Glu Ala Tyr Val Val Leu Ser Asp
50 55 60

Pro Lys Glu Arg Ser Ser Tyr Asp Gln Leu Tyr Leu Ala His Ala Tyr
65 70 75 80

Asp Pro Asp Asn Ala Ala Thr Thr Lys Val Ala Val Glu Asn Arg Gly
85 90 95

Asp Ser Asn Asn Gly His Phe Asp Val Gln Ser Leu Ser Ile Glu Val
100 105 110

Ser Ser Glu Glu Leu Ile Gly Ala Leu Leu Ile Leu Gln Glu Leu Gly
115 120 125

Glu Tyr Glu Leu Val Leu Lys Leu Gly Arg Asn Tyr Leu Gly Asn Gln
130 135 140

Asn Gly Thr Ala Ser Thr Arg Asn Gly Asn His Arg Thr Pro Glu Glu
145 150 155 160

Phe Leu Asp Ser Ser Glu Arg Pro Asp Ile Leu Leu Thr Val Ala Leu
165 170 175

Ala Ser Leu Glu Leu Gly Arg Glu Gln Trp Gln Gln Gly His Tyr Glu
180 185 190

Asn Ala Ala Leu Ser Leu Glu Thr Gly Gln Glu Val Leu Phe Ser Glu
195 200 205

```
Gly Ile Phe Pro Ser Val Gln Ala Glu Ile Gln Ala Asp Leu Tyr Lys
    210                 215                 220

Leu Arg Pro Tyr Arg Ile Leu Glu Leu Leu Ala Leu Pro Gln Glu Lys
225                 230                 235                 240

Thr Ile Glu Arg His Gln Gly Leu Asp Leu Leu Gln Ser Ile Leu Asp
                245                 250                 255

Asp Arg Gly Gly Ile Asp Gly Thr Gly Asn Asp Gln Ser Gly Leu Asn
            260                 265                 270

Ile Asp Asp Phe Leu Arg Phe Ile Gln Gln Leu Arg His His Leu Thr
        275                 280                 285

Val Ala Glu Gln His Lys Leu Phe Asp Gly Glu Ser Lys Arg Pro Ser
    290                 295                 300

Ala Val Ala Thr Tyr Leu Ala Val Tyr Ala Ser Ile Ala Arg Gly Phe
305                 310                 315                 320

Thr Gln Arg Gln Pro Ala Leu Ile Arg His Ala Lys Gln Ile Leu Met
                325                 330                 335

Arg Leu Ser Lys Arg Gln Asp Val His Leu Glu Gln Ser Leu Cys Ala
            340                 345                 350

Leu Leu Leu Gly Gln Thr Glu Glu Ala Thr Arg Val Leu Glu Leu Ser
        355                 360                 365

Gln Glu Tyr Glu Ala Leu Ala Leu Ile Arg Glu Lys Ser Gln Asp Ser
    370                 375                 380

Pro Asp Leu Leu Pro Gly Leu Cys Leu Tyr Ala Glu Gln Trp Leu Gln
385                 390                 395                 400

Asn Glu Val Phe Pro His Phe Arg Asp Leu Ser Arg Gln Gln Ala Ser
                405                 410                 415

Leu Lys Asp Tyr Phe Ala Asn Gln Gln Val Gln Ala Tyr Leu Glu Ala
            420                 425                 430
```

```
Leu Pro Asn Asp Ala Glu Thr Thr Asn Glu Trp Ala Val Ile Asn Arg
        435                 440                 445

Gln Ser Phe Ser Gln Pro Arg Gly Asn Ser Tyr Ser Gly Gly Thr Pro
    450                 455                 460

Val Ala Lys Arg Pro Val Gly Lys Ala Asn Arg Pro Gly Glu Ala Ser
465                 470                 475                 480

Thr Arg Pro Val Pro Gln Arg Ser His Pro Ser Glu Val Asn Arg Gln
                485                 490                 495

Phe His Gln Asn Arg Thr Pro Asp Pro Glu Leu Pro Glu Thr Ser Asn
            500                 505                 510

His Arg Arg Pro Glu Ser Ser Asn Phe Thr Thr Ala Arg Glu Asn Ile
        515                 520                 525

Ser Thr Thr Asp Ala Tyr Thr Asp Asn Tyr Pro Pro Glu Ile Pro Val
    530                 535                 540

Glu Arg Ala Ser Arg Pro Val Gln Pro Gly Val Ser Gly Tyr Thr Gln
545                 550                 555                 560

Ser Thr Pro Pro Arg Gln Thr Pro Lys Arg Arg Arg Arg Lys Lys Pro
                565                 570                 575

Gln Ala Val Val Asn Arg Gly His Ser Ile His Gln Gln Arg Gln Pro
            580                 585                 590

Ser Pro Ser Thr Leu Gly Arg Lys Thr Arg Leu Leu Trp Ile Val Leu
        595                 600                 605

Gly Ser Leu Gly Gly Ile Leu Leu Phe Trp Leu Ile Val Ser Thr Thr
    610                 615                 620

Phe Gly Trp Leu Lys Asn Val Phe Phe Pro Ala Pro Ser Leu Gln Gly
625                 630                 635                 640

Glu Gln Leu Ser Ile Gln Ile Ser Gln Pro Pro Leu
                645                 650
```

<210> 116
<211> 624
<212> PRT
<213> Nostoc punctiforme

<400> 116

Met Arg Ile Pro Leu Asp Tyr Tyr Arg Ile Leu Gly Leu Pro Leu Ala
1 5 10 15

Ala Ser Glu Glu Gln Leu Arg Gln Ala Tyr Ser Asp Arg Ile Val Gln
20 25 30

Leu Pro Arg Arg Glu Tyr Ser Gln Ala Ala Ile Ser Ser Arg Lys Gln
35 40 45

Leu Ile Glu Glu Ala Tyr Val Val Leu Ser Asp Pro Lys Gln Arg Ser
50 55 60

Thr Tyr Asp Gln Leu Tyr Leu Ala His Ala Tyr Asp Pro Asp Asn Leu
65 70 75 80

Ala Ala Ala Ala Val Ala Gln Glu Asn Arg Thr Glu Ser Thr Lys Arg
85 90 95

Gly Ser Asp Thr Gln Ser Leu Gly Ile Glu Ile Thr Gln Asp Glu Leu
100 105 110

Val Gly Ala Leu Leu Ile Leu Gln Glu Leu Gly Glu Tyr Glu Leu Val
115 120 125

Leu Lys Leu Gly Arg Pro Tyr Leu Val Asn Lys Asn Ser Ala Thr Ser
130 135 140

Ser Arg Lys Ser Asn Asn Leu Ala Asp Glu Glu Ile Tyr Glu Ser Ala
145 150 155 160

Glu His Pro Asp Val Val Leu Thr Val Ala Leu Ala Cys Leu Glu Leu
165 170 175

Gly Arg Glu Gln Trp Gln Gln Gly His Tyr Glu Asn Ala Ala Ile Ser
180 185 190

Leu Glu Thr Gly Gln Glu Leu Leu Val Arg Glu Gly Leu Phe Ser Ser
195 200 205

```
Ile Gln Ala Glu Ile Gln Ala Asp Leu Tyr Lys Leu Arg Pro Tyr Arg
    210                 215                 220

Ile Leu Glu Leu Leu Ala Leu Pro Gln Glu Lys Thr Ala Glu Arg Ser
225                 230                 235                 240

Gln Gly Leu Glu Leu Leu Gln Asn Leu Leu Glu Asp Arg Gly Gly Ile
                245                 250                 255

Asp Gly Thr Asn Asn Asp Glu Ser Gly Leu Asn Ile Asp Asp Phe Leu
            260                 265                 270

Arg Phe Ile Gln Gln Leu Arg Asn His Leu Thr Val Ala Glu Gln His
        275                 280                 285

Lys Leu Phe Glu Ala Gln Ser Lys Arg Ser Ser Ala Val Ala Thr Tyr
    290                 295                 300

Leu Ala Val Tyr Ala Leu Ile Ala Arg Gly Phe Ala Gln Arg Gln Pro
305                 310                 315                 320

Ala Leu Ile Arg Gln Ala Arg Gln Met Leu Val Arg Leu Gly Lys Arg
                325                 330                 335

Gln Asp Val His Leu Glu Gln Ser Leu Cys Ala Leu Leu Leu Gly Gln
            340                 345                 350

Thr Glu Glu Ala Thr Arg Val Leu Glu Leu Ser Gln Glu Tyr Glu Ala
        355                 360                 365

Leu Ala Phe Ile Arg Glu Lys Ser Gln Asp Ser Pro Asp Leu Leu Pro
    370                 375                 380

Gly Leu Cys Leu Tyr Ala Glu Gln Trp Leu Gln His Glu Val Phe Pro
385                 390                 395                 400

His Phe Arg Asp Leu Ala Asn Gln Gln Ala Phe Leu Lys Asp Tyr Phe
                405                 410                 415
```

Ala Asn Gln Gln Val Gln Ala Tyr Leu Glu Ala Leu Pro Thr Asp Ala
420 425 430

Gln Thr Thr Asn Glu Trp Ala Val Ile Asn Pro Gln Tyr Phe Pro Gln
435 440 445

Ala Lys Ala Lys Asn Thr His Phe His Asn Asn Ser Thr Lys Thr Ser
450 455 460

Ala Ser Phe Asn His Ser Arg Val Pro Asn Pro Asp Leu Pro Glu Thr
465 470 475 480

Pro Thr Lys Glu Thr Ser Glu Tyr Pro Asn Phe Ser Pro Pro Met Trp
485 490 495

Ser Ser Ser Gly Ser Ile Lys Ser Glu Val Pro Ala Ala Glu Arg Met
500 505 510

Ser Arg Gly Thr Asn Gln His Leu Asn Gly Ser Ala Lys Ser Ala Ala
515 520 525

Ser Gly His Asn Gln Lys Arg Arg Arg Arg Lys Pro Thr Pro Ser Ala
530 535 540

Ser Arg Glu Arg Ile Pro Asp Asn Arg Pro His Ser Arg Arg Pro Arg
545 550 555 560

Arg Arg Arg Thr Phe Ala Asn Thr Ile Glu Gly Lys Thr Arg Leu Val
565 570 575

Trp Arg Val Phe Ile Ser Leu Val Ser Ile Leu Val Phe Trp Val Leu
580 585 590

Ala Thr Thr Thr Phe Gly Trp Leu Lys Asn Leu Phe Phe Pro Gln Pro
595 600 605

Ser Pro Pro Asp Leu Gln Leu Phe Val Gln Ile Asn Gln Pro Pro Leu
610 615 620

<210> 117
<211> 557
<212> PRT
<213> Protochlorococcus marinus MED4

<400> 117

Met Glu Leu Pro Leu Asp His Phe Arg Leu Ile Gly Val Ser Pro Ser
1 5 10 15

Ala Thr Ser Glu Glu Ile Leu Arg Ala Phe Gln Leu Arg Leu Asp Lys
20 25 30

Thr Pro Asp Glu Gly Phe Thr Tyr Glu Val Leu Thr Gln Arg Ser Glu
35 40 45

Leu Leu Arg Leu Thr Ala Asp Leu Leu Thr Asp Pro Asp Ser Arg Arg
50 55 60

Asp Tyr Glu Asn Leu Leu Leu Asn Gly Ala Ser Gly Leu Asp Leu Ser
65 70 75 80

Ser Asn Arg Glu Val Ala Gly Leu Ile Leu Leu Trp Glu Ser Gly Ser
85 90 95

Ser Lys Glu Ala Phe Lys Ile Thr Arg Lys Ala Leu Gln Pro Pro Gln
100 105 110

Thr Pro Ala Leu Gly Ser Ser Arg Glu Ala Asp Leu Thr Leu Leu Ala
115 120 125

Ala Leu Thr Ser Arg Asp Ala Ala Ile Gln Glu Gln Asp Gln Arg Ser
130 135 140

Tyr Ser Asn Ala Ala Asp Phe Leu Gln Glu Gly Ile Gln Leu Leu Gln
145 150 155 160

Arg Met Gly Lys Leu Gly Glu Leu Arg Lys Thr Leu Glu Glu Asp Leu
165 170 175

Val Ser Leu Leu Pro Tyr Arg Ile Leu Asp Leu Leu Ser Arg Asp Leu
180 185 190

Asn Asp Tyr Asp Ser His Lys Lys Gly Leu Ser Met Leu Glu Asn Leu
195 200 205

```
Ile Ile Lys Arg Gly Gly Leu Glu Gly Lys Asn Lys Ser Glu Tyr Asn
    210                 215                 220

Asp Phe Leu Asn Gln Gln Glu Phe Glu Ser Phe Phe Gln Gln Ile Lys
225                 230                 235                 240

Pro Phe Leu Thr Val Gln Asp Gln Ile Asp Leu Phe Leu Glu Leu Gln
                245                 250                 255

Lys Arg Gly Ser Ser Glu Ala Gly Phe Leu Ala Phe Leu Ser Leu Thr
            260                 265                 270

Ala Ile Gly Phe Ala Arg Arg Lys Pro Ala Lys Leu Phe Glu Ala Arg
        275                 280                 285

Lys Ile Leu Lys Lys Leu Asn Leu Ser Gly Leu Asp Ser Met Pro Leu
    290                 295                 300

Ile Gly Cys Leu Asp Leu Leu Leu Ala Asp Val Glu Gln Ser Ser Ala
305                 310                 315                 320

Arg Phe Leu Ser Ser Ser Asp Glu Lys Leu Arg Asp Trp Leu Asn Asn
                325                 330                 335

Tyr Pro Gly Glu Lys Leu Glu Ala Ile Cys Ile Phe Cys Lys Asn Trp
            340                 345                 350

Leu Glu Asn Asp Val Leu Val Gly Tyr Arg Asp Ile Asp Leu Lys Glu
        355                 360                 365

Ile Asp Leu Asp Ser Trp Phe Glu Asp Arg Glu Ile Gln Glu Phe Ile
    370                 375                 380

Glu Gln Ile Glu Lys Lys Ser Asn Arg Thr Val Phe Lys Ser Gly Pro
385                 390                 395                 400

Gln Asn Lys Pro Ile Phe Gln Ala Gln Glu Ser Leu Lys Asp Ser Ser
                405                 410                 415
```

```
Thr Gly Pro Asp Leu Asn Ser Asp Asn Phe Glu Glu Gly Arg Leu Pro
            420                 425                 430

Leu Pro Gly Gly Val Arg Glu Asp Gly Gln Glu Val Ile Glu Glu Asn
        435                 440                 445

Ile Tyr Thr Asp Glu Ile Ile Lys Asn Lys Ser Ile Glu Phe Tyr Lys
    450                 455                 460

Tyr Ala Ile Glu Lys Ile Ala Glu Leu Lys Phe Val Phe Gly Glu Ala
465                 470                 475                 480

Leu Glu Asn Tyr Arg Ile Phe Asn Lys Ser Ser Tyr Leu Thr Tyr Leu
                485                 490                 495

Tyr Ala Phe Leu Ile Leu Phe Ala Phe Gly Leu Gly Val Gly Phe Val
            500                 505                 510

Arg Asn Asn Leu Lys Lys Pro Val Gln Glu Lys Glu Ile Ile Asp Asn
        515                 520                 525

Ser Leu Ser Ile Asn Glu Asn Lys Asn Val Phe Tyr Glu Gly Leu Asn
    530                 535                 540

Gln Asp Asp Lys Lys Lys Val Leu Asp Asn Ser Lys Ile
545                 550                 555
```

<210> 118
<211> 524
<212> PRT
<213> Protochlorococcus marinus MT9313

<400> 118

```
Met Ala Ala Gln Leu Val Asp Leu Pro Ile Asp His Phe Arg Leu Leu
1               5                   10                  15

Gly Val Ser Pro Ser Ala Asp Ser Glu Ala Ile Leu Arg Ala Leu Glu
            20                  25                  30

Leu Arg Leu Asp Arg Cys Pro Asp Gln Gly Phe Thr His Glu Val Leu
        35                  40                  45

Ile Gln Arg Ala Glu Leu Leu Arg Leu Ser Ala Asp Leu Leu Thr Asp
    50                  55                  60
```

```
Pro Pro Arg Arg Gln Ala Tyr Glu Thr Ala Leu Leu Glu Leu Ser Arg
65                  70                  75                  80

Asp His Pro Gly Glu Thr Ala Gly Leu Asp Val Ser Pro Ser Arg Glu
                85                  90                  95

Val Ala Gly Leu Ile Leu Leu Phe Glu Ala Asn Ser Ser His Glu Val
            100                 105                 110

Phe His Leu Ala Ser Gln Gly Leu Gln Pro Pro Gln Ser Pro Thr Leu
        115                 120                 125

Gly Ser Glu Arg Glu Ala Asp Leu Ala Leu Leu Leu Ala Leu Ala Cys
    130                 135                 140

Arg Ala Ala Ala Ala Glu Glu Gln Glu Gln Arg Arg Tyr Glu Ala Ala
145                 150                 155                 160

Ala Ser Leu Leu His Asp Gly Ile Gln Leu Leu Gln Arg Met Gly Lys
                165                 170                 175

Leu Ser Glu Glu Cys His Lys Leu Glu Asn Asp Leu Asp Ala Leu Leu
            180                 185                 190

Pro Tyr Arg Ile Leu Asp Leu Leu Ser Arg Asp Leu Gly Asp Gln Val
        195                 200                 205

Ser His Gln Glu Gly Leu Arg Leu Leu Asp Asn Phe Val Ser Gln Arg
    210                 215                 220

Gly Gly Leu Glu Gly Thr Ala Pro Ser Pro Ala Pro Gly Gly Leu Asp
225                 230                 235                 240

Gln Ser Glu Phe Asp Asn Phe Phe Lys Gln Ile Arg Lys Phe Leu Thr
                245                 250                 255

Val Gln Glu Gln Val Asp Leu Phe Leu Arg Trp Gln Gln Ala Gly Ser
            260                 265                 270

Ala Asp Ala Gly Phe Leu Gly Gly Leu Ala Leu Ala Ala Val Gly Phe
        275                 280                 285
```

```
Ser Arg Arg Lys Pro Glu Arg Val Gln Glu Ala Arg Gln His Leu Glu
    290                 295                 300

Arg Leu Gln Leu Asp Gly Cys Asp Pro Leu Pro Met Leu Gly Cys Leu
305                 310                 315                 320

Asp Leu Leu Leu Gly Asp Val Gly Arg Ala Gln Glu Arg Phe Leu Arg
                325                 330                 335

Ser Thr Asp Pro Arg Val Lys Asp Cys Leu Asn Ser His Pro Gly Asp
            340                 345                 350

Glu Leu Ala Ala Phe Cys Glu Tyr Cys Arg Ser Trp Leu Arg Gly Asp
        355                 360                 365

Val Leu Pro Gly Tyr Arg Asp Val Asp Ala Glu Ala Val Asp Leu Glu
    370                 375                 380

Ala Trp Phe Ala Asp Arg Asp Val Gln Ala Tyr Val Glu Arg Leu Glu
385                 390                 395                 400

Arg Ser Glu Asn Arg Ala Ser Ser Leu Gly Lys Ala Phe Ser Gly Ser
                405                 410                 415

Ser Val Lys Gln Pro Phe Pro Trp Ala Pro Leu Asp Pro Asp Gly Ile
            420                 425                 430

Leu Pro Leu Ser Leu Gly Gly Pro Asp Val Gly Gln Pro Ala Ala Asp
        435                 440                 445

Gln Ser Ser Asp Glu Phe Ala Ser Asp Gly Met Ala Trp Ile Asp Arg
    450                 455                 460

Leu Ala Asp Leu Pro Arg Pro Thr Arg Pro Val Leu Ile Gly Ser Val
465                 470                 475                 480

Val Phe Ala Ala Leu Ile Ala Ala Phe Ala Gly Phe Ser Leu Phe Gly
                485                 490                 495

Gln Arg Pro Arg Thr Ser Val Ser Thr Ala Ala Asp Gln Pro Gln Val
            500                 505                 510
```

Thr Ala Pro Pro Thr Ala Thr Leu Gln Glu Glu Val
515 520

<210> 119
<211> 566
<212> PRT
<213> Synechocystis PCC6803

<400> 119

Met Phe Ile Pro Leu Asp Phe Tyr Arg Ile Leu Gly Ile Pro Pro Gln
1 5 10 15

Ser Gly Gly Glu Thr Ile Glu Gln Ala Tyr Gln Asp Arg Leu Leu Gln
20 25 30

Leu Pro Arg Arg Glu Phe Ser Asp Ala Ala Val Thr Leu Arg Asn Gln
35 40 45

Leu Leu Ala Ile Ala Tyr Glu Thr Leu Arg Asp Pro Glu Lys Arg Gln
50 55 60

Ala Tyr Asp Gln Glu Trp Trp Gly Ala Met Asp Glu Ala Leu Gly Glu
65 70 75 80

Ala Leu Pro Leu Thr Thr Pro Glu Leu Glu Cys Ser Pro Glu Gln Glu
85 90 95

Ile Gly Ala Leu Leu Ile Leu Leu Asp Leu Gly Glu Tyr Glu Leu Val
100 105 110

Val Lys Tyr Gly Glu Pro Val Leu His Asp Pro Asn Pro Pro Ala Gly
115 120 125

Gly Leu Pro Gln Asp Tyr Leu Leu Ser Val Ile Leu Ala His Trp Glu
130 135 140

Leu Ser Arg Glu Arg Trp Gln Gln Gln Gln Tyr Glu Phe Ala Ala Thr
145 150 155 160

Ala Ser Leu Lys Ala Leu Ala Arg Leu Gln Gln Asp Asn Asp Phe Pro
165 170 175

Ala Leu Glu Ala Glu Ile Arg Gln Glu Leu Tyr Arg Leu Arg Pro Tyr
180 185 190

```
Arg Ile Leu Glu Leu Leu Ala Lys Glu Gly Gln Gly Glu Glu Gln Arg
        195                 200                 205

Gln Gln Gly Leu Ala Leu Leu Gln Ala Met Val Gln Asp Arg Gly Gly
    210                 215                 220

Ile Glu Gly Lys Gly Glu Asp Tyr Ser Gly Leu Gly Asn Asp Asp Phe
225                 230                 235                 240

Leu Lys Phe Ile His Gln Leu Arg Cys His Leu Thr Val Ala Glu Gln
                245                 250                 255

Asn Ala Leu Phe Leu Pro Glu Ser Gln Arg Pro Ser Leu Val Ala Ser
            260                 265                 270

Tyr Leu Ala Val His Ser Leu Met Ala Glu Gly Val Lys Glu Gln Asp
        275                 280                 285

Pro Met Ala Ile Val Glu Ala Lys Ser Leu Ile Ile Gln Leu Glu Asn
    290                 295                 300

Cys Gln Asp Leu Ala Leu Glu Lys Val Ile Cys Glu Leu Leu Leu Gly
305                 310                 315                 320

Gln Thr Glu Val Val Leu Ala Ala Ile Asp Gln Gly Asp Pro Lys Ile
                325                 330                 335

Val Ala Gly Leu Glu Ser Lys Leu Ala Thr Gly Glu Asp Pro Leu Thr
            340                 345                 350

Ala Phe Tyr Thr Phe Thr Glu Gln Trp Leu Glu Glu Glu Ile Val Pro
        355                 360                 365

Tyr Phe Arg Asp Leu Ser Pro Glu Thr Leu Ser Pro Lys Ala Tyr Phe
    370                 375                 380

Asn Asn Pro Ser Val Gln Gln Tyr Leu Glu Gln Leu Glu Pro Asp Ser
385                 390                 395                 400

Phe Thr Thr Asp Asn Ser Phe Ala Ser Pro Ala Leu Leu Ser Thr Ala
                405                 410                 415
```

```
Thr Glu Ser Glu Thr Pro Met Val His Ser Ser Ala Ala Leu Pro Asp
            420                 425                 430

Arg Pro Leu Thr Ser Thr Val Pro Ser Arg Arg Gly Arg Ser Pro Arg
        435                 440                 445

Arg Ser Arg Asp Asp Val Phe Pro Ser Ala Asp Asn Ser Ser Gly Leu
    450                 455                 460

Ala Val Thr Thr Leu Ser Pro Ala Ile Ala Tyr Asp Thr His Ser Leu
465                 470                 475                 480

Gly Thr Asn Gly Ile Gly Gly Asp Ser Thr Ser Asn Gly Phe Ser Ser
                485                 490                 495

Asn Ser Ala Pro Glu Ser Thr Ser Lys His Lys Ser Pro Arg Arg Arg
            500                 505                 510

Lys Lys Arg Val Thr Ile Lys Pro Val Arg Phe Gly Ile Phe Leu Leu
        515                 520                 525

Cys Leu Ala Gly Ile Val Gly Gly Ala Thr Ala Leu Ile Ile Asn Arg
    530                 535                 540

Thr Gly Asp Pro Leu Gly Gly Leu Leu Glu Asp Pro Leu Asp Val Phe
545                 550                 555                 560

Leu Asp Gln Pro Ser Glu
                565
```

<210> 120
<211> 573
<212> PRT
<213> Synechococcus PCC7002

<400> 120

```
Thr Val Arg Ile Pro Leu Asp Tyr Tyr Arg Ile Leu Cys Val Pro Ala
1               5                   10                  15

Lys Ala Thr Thr Ala Gln Ile Thr Gln Ala Tyr Arg Asp Arg Leu Ser
            20                  25                  30

Gln Phe Pro Arg Arg Glu His Asn Ala Leu Ala Ile Glu Ala Arg Asn
        35                  40                  45
```

```
Arg Ile Ile Glu Gln Ala Phe Glu Val Leu Ser Gln Thr Glu Thr Arg
    50                  55                  60

Ala Val Tyr Asp His Glu Leu Ser Gly Asn Met Phe Arg Ser Leu Val
65                  70                  75                  80

Pro Ser Arg Pro Lys Leu Pro Phe Pro Asp Arg Pro Ser Ser Asp Thr
                85                  90                  95

Glu Leu Glu Ala Leu Thr Ala His Gln Pro Thr Ile Asp Ile Ala Glu
            100                 105                 110

Lys Asp Leu Leu Gly Gly Leu Leu Leu Leu Leu Asp Leu Gly Glu Tyr
        115                 120                 125

Glu Leu Val Leu Lys Trp Ala Ala Pro Tyr Leu Lys Gly Lys Gly Lys
    130                 135                 140

Leu Val Lys Glu Gly Lys Phe Gly Ala Val Glu Ile Val Glu Gln Glu
145                 150                 155                 160

Leu Arg Leu Cys Leu Ala Leu Ala His Trp Glu Leu Ser Arg Glu Gln
                165                 170                 175

Trp Leu Gln Gln His Tyr Glu Gln Ala Ala Leu Ser Gly Gln Lys Ser
            180                 185                 190

Gln Glu Leu Leu Val Asp Val Ala Gln Phe Ala Asp Leu Gln Gln Glu
        195                 200                 205

Ile Gln Gly Asp Leu Asn Arg Leu Arg Pro Tyr Gln Val Leu Glu Leu
    210                 215                 220

Leu Ala Leu Pro Glu Ser Glu Thr Gln Glu Arg Gln Arg Gly Leu Gln
225                 230                 235                 240

Leu Leu Gln Glu Met Leu Ser Ala Arg Val Gly Ile Asp Gly Gln Gly
                245                 250                 255

Asp Asp Gln Ser Gly Leu Ser Ile Asp Asp Phe Leu Arg Phe Ile Gln
            260                 265                 270
```

```
Gln Leu Arg Ser Tyr Leu Thr Val Gln Glu Gln Leu Asp Leu Phe Val
        275                 280                 285

Ala Glu Ser Lys Arg Pro Ser Ala Ala Ala Ala Tyr Leu Ala Val Tyr
    290                 295                 300

Ala Leu Leu Ala Ala Gly Phe Ser Gln Arg Lys Pro Asp Leu Val Val
305                 310                 315                 320

Gln Ala Gln Thr Leu Leu Lys Arg Leu Gly Lys Arg Gln Asp Val Phe
                325                 330                 335

Leu Glu Gln Ser Ile Cys Ala Leu Leu Leu Gly Gln Pro Ser Glu Ala
            340                 345                 350

Asn Gln Leu Leu Glu Gln Ser Gln Glu Gln Glu Ala Ile Ala Tyr Ile
        355                 360                 365

Gln Glu Gln Ser Glu Gly Ala Pro Asp Leu Leu Pro Gly Leu Cys Leu
    370                 375                 380

Tyr Gly Glu Gln Trp Leu Lys Thr Glu Val Phe Ser His Phe Arg Asp
385                 390                 395                 400

Leu Arg Gln Arg Leu Glu Asp Gly Ser Val Ser Leu Thr Ala Tyr Phe
                405                 410                 415

Ala Asp Pro Glu Val Gln Gln Tyr Leu Asp Asp Leu Leu Thr Glu Ala
            420                 425                 430

Val Pro Thr Pro Thr Pro His Pro Asp Thr Glu Ser Thr Ala Ala Pro
        435                 440                 445

Ser Glu Lys Pro Pro Glu Thr Leu Gln Ser Glu Thr Gly Val Ser Pro
    450                 455                 460

His Pro Ser Arg Pro Ala Lys Val Asp Ser Phe Glu Asp Leu Val Thr
465                 470                 475                 480

Gln Thr Pro Ala Thr Val Pro Pro Ala Pro Pro Ser Pro Gly Val Ala
                485                 490                 495
```

```
Pro Val Thr Ala Ala Leu Asn Pro Asp Pro Glu Ala Ser Ser Ala Ser
            500                 505                 510

Ser Lys Ser Val Ser Ser Lys Lys Ser Ile Gly Pro Trp Gly Ala Ile
        515                 520                 525

Ala Ala Ile Val Gly Ser Val Leu Leu Val Val Gly Leu Val Arg Ile
    530                 535                 540

Leu Ser Gly Leu Thr Thr Gln Glu Pro Leu Gln Val Thr Leu Asn Gly
545                 550                 555                 560

Glu Pro Pro Leu Thr Ile Pro Ser Leu Asp Thr Ala Glu
                565                 570
```

<210> 121
<211> 515
<212> PRT
<213> Synechococcus WH8102

<400> 121

```
Gly Asp Leu Trp Thr Leu Asp Leu Pro Ile Asp His Phe Arg Leu Leu
1               5                   10                  15

Gly Val Ser Pro Ser Ala Asp Pro Ala Ser Ile Leu Arg Arg Leu Gln
            20                  25                  30

Thr Arg Ser Asp Ser Pro Pro Asp Asp Gly Phe Thr His Glu Gly Leu
        35                  40                  45

Leu Gln Arg Gln Ala Leu Leu His Arg Ser Ala Asp Leu Leu Thr Asp
    50                  55                  60

Pro Ser Glu Arg Ala Asp Tyr Glu Ala Ala Leu Leu Ser Leu Ser Ala
65                  70                  75                  80

Thr His Pro Asn Glu Thr Val Gly Leu Asp Leu Ala Ala Ser Ser Glu
                85                  90                  95

Val Ala Gly Leu Ile Leu Leu Trp Glu Ala Gly Ala Ala Leu Glu Ala
            100                 105                 110

Phe Gln Leu Ala Arg Gln Gly Leu Gln Pro Pro Gln Ala Pro Ala Leu
        115                 120                 125
```

```
Gly Ser Gly Arg Glu Ala Asp Leu Thr Leu Leu Ala Ala Leu Ala Cys
    130                 135                 140

Arg Asp Ala Ala Arg Asp Glu Gln Gln Gln Arg Arg Tyr Glu Ser Ala
145                 150                 155                 160

Ala Gln Leu Leu Arg Asp Gly Ile Glu Leu Gln Gln Arg Met Gly Lys
                165                 170                 175

Leu Pro Asp Gln Gln Ala Arg Leu Gln Gln Glu Leu Asp Asp Leu Leu
            180                 185                 190

Pro Tyr Arg Val Leu Asp Leu Leu Ser Arg Asp Leu Ser Asp Ala Asp
        195                 200                 205

Ala Arg Gln Gln Gly Ile Ser Leu Leu Asp Gln Leu Val Arg Asp Arg
    210                 215                 220

Gly Gly Leu Asp Pro Glu Gly Leu Asp Ser Glu Thr Pro Ala Ala Met
225                 230                 235                 240

Gly Gln Ala Asp Phe Glu Ser Phe Phe Gln Gln Ile Arg Arg Phe Leu
                245                 250                 255

Thr Val Gln Glu Gln Val Asp Leu Phe Arg Gly Trp Phe Ala Glu Gly
            260                 265                 270

Ser Ile Glu Ala Gly Cys Leu Ala Val Phe Ala Leu Ala Ala Ala Gly
        275                 280                 285

Tyr Ser Arg Arg Lys Pro Glu Phe Leu Glu Gln Ala Arg Glu Gln Leu
    290                 295                 300

Gln Arg Leu Val Ala Ser Asp Leu Asp Pro Met Pro Leu Leu Gly Cys
305                 310                 315                 320

Leu Asp Leu Leu Leu Gly Asn Val Ala Glu Ala Ser Leu His Phe Ser
                325                 330                 335

Ala Ile Arg Asp Glu Glu Leu Leu Ser Trp Leu Ala Glu His Pro Gly
            340                 345                 350
```

```
Asp His Leu Ala Ala Gln Cys Glu Tyr Cys Arg Val Trp Leu Glu Arg
        355                 360                 365

Asp Val Leu Pro Gly Tyr Arg Asp Val Asp Ala Ala Gly Val Asp Leu
    370                 375                 380

Asp Ala Trp Phe Ala Asp Arg Asp Val Gln Ala Tyr Val Asp Arg Ile
385                 390                 395                 400

Asp Arg Gln Ser Ala Arg Leu Gly Ser Ala Ala Thr Val Thr Gly Ala
                405                 410                 415

Gly Leu Ser Ser Ala Pro Ser Ala Asp Ala Ser Ser Pro His Glu Ala
            420                 425                 430

Ala Leu Asp Asp Asp His Leu Pro Ala Glu Glu Ala Pro Ser Ser Asp
        435                 440                 445

Pro Ala Asn Gln Arg Leu Ser Asn Arg Leu Arg Trp Leu Ala Ala Ser
    450                 455                 460

Leu Val Val Gly Leu Val Ala Ala Leu Ala Ala Ala Val Met Leu Arg
465                 470                 475                 480

Pro Arg Glu Thr Ala Pro Val Val Leu Gln Pro Glu Pro Asp Arg Gln
                485                 490                 495

Asp Ala Val Glu Pro Lys Pro Ser Ala Gln Asp Ser Ala Thr Leu Lys
            500                 505                 510

Pro Gln Ala
        515
```

<210> 122
<211> 525
<212> PRT
<213> Oryza sativa

<400> 122

```
Ala Ala Glu Arg Ser Leu Pro Leu Gln Val Asp Phe Tyr Lys Val Leu
1               5                   10                  15

Gly Ala Glu Pro His Phe Leu Gly Asp Gly Ile Arg Arg Ala Phe Glu
            20                  25                  30
```

```
Ala Arg Ile Ala Lys Pro Pro Gln Tyr Gly Tyr Ser Thr Asp Ala Leu
        35                  40                  45

Val Gly Arg Arg Gln Met Leu Gln Ile Ala His Asp Thr Leu Met Asn
    50                  55                  60

Gln Asn Ser Arg Thr Gln Tyr Asp Arg Ala Leu Ser Glu Asn Arg Glu
65                  70                  75                  80

Glu Ala Leu Thr Met Asp Ile Ala Trp Asp Lys Glu Ala Gly Glu Ala
                85                  90                  95

Leu Ala Val Leu Val Thr Gly Glu Gln Leu Leu Leu Asp Arg Pro Pro
            100                 105                 110

Lys Arg Phe Lys Gln Asp Val Val Leu Ala Met Ala Leu Ala Tyr Val
        115                 120                 125

Asp Leu Ser Arg Asp Ala Met Ala Ala Ser Pro Pro Asp Val Ile Gly
    130                 135                 140

Cys Cys Glu Val Leu Glu Arg Ala Leu Lys Leu Leu Gln Glu Asp Gly
145                 150                 155                 160

Ala Ser Asn Leu Ala Pro Asp Leu Leu Ser Gln Ile Asp Glu Thr Leu
                165                 170                 175

Glu Glu Ile Thr Pro Arg Cys Val Leu Glu Leu Leu Ser Leu Pro Ile
            180                 185                 190

Asp Thr Glu His His Lys Lys Arg Gln Glu Gly Leu Gln Gly Ala Arg
        195                 200                 205

Asn Ile Leu Trp Ser Val Gly Arg Gly Gly Ile Ala Thr Val Gly Gly
    210                 215                 220

Gly Phe Ser Arg Glu Ala Phe Met Asn Glu Ala Phe Leu Arg Met Thr
225                 230                 235                 240

Ser Ile Glu Gln Met Asp Phe Phe Ser Lys Thr Pro Asn Ser Ile Pro
                245                 250                 255
```

```
Pro Glu Trp Phe Glu Ile Tyr Asn Val Ala Leu Ala His Val Ala Gln
            260                 265                 270

Ala Ile Ile Ser Lys Arg Pro Gln Phe Ile Met Met Ala Asp Asp Leu
        275                 280                 285

Phe Glu Gln Leu Gln Lys Phe Asn Ile Gly Ser His Tyr Ala Tyr Asp
    290                 295                 300

Asn Glu Met Asp Leu Ala Leu Glu Arg Ala Phe Cys Ser Leu Leu Val
305                 310                 315                 320

Gly Asp Val Ser Lys Cys Arg Met Trp Leu Gly Ile Asp Asn Glu Ser
                325                 330                 335

Ser Pro Tyr Arg Asp Pro Lys Ile Leu Glu Phe Ile Val Thr Asn Ser
            340                 345                 350

Ser Ile Ser Glu Glu Asn Asp Leu Leu Pro Gly Leu Cys Lys Leu Leu
        355                 360                 365

Glu Thr Trp Leu Ile Phe Glu Val Phe Pro Arg Ser Arg Asp Thr Arg
    370                 375                 380

Gly Met Gln Phe Arg Leu Gly Asp Tyr Tyr Asp Asp Pro Glu Val Leu
385                 390                 395                 400

Ser Tyr Leu Glu Arg Met Glu Gly Gly Gly Ala Ser His Leu Ala Ala
                405                 410                 415

Ala Ala Ala Ile Ala Lys Leu Gly Ala Gln Ala Thr Ala Ala Leu Gly
            420                 425                 430

Thr Val Lys Ser Asn Ala Ile Gln Ala Phe Asn Lys Val Phe Pro Leu
        435                 440                 445

Ile Glu Gln Leu Asp Arg Ser Ala Met Glu Asn Thr Lys Asp Gly Pro
    450                 455                 460

Gly Gly Tyr Leu Glu Asn Phe Asp Gln Glu Asn Ala Pro Ala His Asp
465                 470                 475                 480
```

```
Ser Arg Asn Ala Ala Leu Lys Ile Ile Ser Ala Gly Ala Leu Phe Ala
                485                 490                 495

Leu Leu Ala Val Ile Gly Ala Lys Tyr Leu Pro Arg Lys Arg Pro Leu
            500                 505                 510

Ser Ala Ile Arg Ser Glu His Gly Ser Val Ala Val Ala
        515                 520                 525
```

<210> 123
<211> 578
<212> PRT
<213> Arabidopsis thaliana

<400> 123

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Arg Pro Glu Arg His Val Pro Ile Pro Ile Asp Phe Tyr Gln Val Leu
1               5                   10                  15

Gly Ala Gln Thr His Phe Leu Thr Asp Gly Ile Arg Arg Ala Phe Glu
            20                  25                  30

Ala Arg Val Ser Lys Pro Pro Gln Phe Gly Phe Ser Asp Asp Ala Leu
        35                  40                  45

Ile Ser Arg Arg Gln Ile Leu Gln Ala Ala Cys Glu Thr Leu Ser Asn
    50                  55                  60

Pro Arg Ser Arg Arg Glu Tyr Asn Glu Gly Leu Leu Asp Asp Glu Glu
65                  70                  75                  80

Ala Thr Val Ile Thr Asp Val Pro Trp Asp Lys Val Pro Gly Ala Leu
                85                  90                  95

Cys Val Leu Gln Glu Gly Gly Glu Thr Glu Ile Val Leu Arg Val Gly
            100                 105                 110

Glu Ala Leu Leu Lys Glu Arg Leu Pro Lys Ser Phe Lys Gln Asp Val
        115                 120                 125

Val Leu Val Met Ala Leu Ala Phe Leu Asp Val Ser Arg Asp Ala Met
    130                 135                 140

Ala Leu Asp Pro Pro Asp Phe Ile Thr Gly Tyr Glu Phe Val Glu Glu
145                 150                 155                 160
```

```
Ala Leu Lys Leu Leu Gln Glu Glu Gly Ala Ser Ser Leu Ala Pro Asp
                165                 170                 175

Leu Arg Ala Gln Ile Asp Glu Thr Leu Glu Glu Ile Thr Pro Arg Tyr
            180                 185                 190

Val Leu Glu Leu Leu Gly Leu Pro Leu Gly Asp Asp Tyr Ala Ala Lys
        195                 200                 205

Arg Leu Asn Gly Leu Ser Gly Val Arg Asn Ile Leu Trp Ser Val Gly
    210                 215                 220

Gly Gly Gly Ala Ser Ala Leu Val Gly Gly Leu Thr Arg Glu Lys Phe
225                 230                 235                 240

Met Asn Glu Ala Phe Leu Arg Met Thr Ala Ala Glu Gln Val Asp Leu
                245                 250                 255

Phe Val Ala Thr Pro Ser Asn Ile Pro Ala Glu Ser Phe Glu Val Tyr
            260                 265                 270

Glu Val Ala Leu Ala Leu Val Ala Gln Ala Phe Ile Gly Lys Lys Pro
        275                 280                 285

His Leu Leu Gln Asp Ala Asp Lys Gln Phe Gln Gln Leu Gln Gln Ala
    290                 295                 300

Lys Val Met Ala Met Glu Ile Pro Ala Met Leu Tyr Asp Thr Arg Asn
305                 310                 315                 320

Asn Trp Glu Ile Asp Phe Gly Leu Glu Arg Gly Leu Cys Ala Leu Leu
                325                 330                 335

Ile Gly Lys Val Asp Glu Cys Arg Met Trp Leu Gly Leu Asp Ser Glu
            340                 345                 350

Asp Ser Gln Tyr Arg Asn Pro Ala Ile Val Glu Phe Val Leu Glu Asn
        355                 360                 365

Ser Asn Arg Asp Asp Asn Asp Asp Leu Pro Gly Leu Cys Lys Leu Leu
    370                 375                 380
```

Glu Thr Trp Leu Ala Gly Val Val Phe Pro Arg Phe Arg Asp Thr Lys
385 390 395 400

Asp Lys Lys Phe Lys Leu Gly Asp Tyr Tyr Asp Asp Pro Met Val Leu
405 410 415

Ser Tyr Leu Glu Arg Val Glu Val Val Gln Gly Ser Pro Leu Ala Ala
420 425 430

Ala Ala Ala Met Ala Arg Ile Gly Ala Glu His Val Lys Ala Ser Ala
435 440 445

Met Gln Ala Leu Gln Lys Val Phe Pro Ser Arg Tyr Thr Asp Arg Asn
450 455 460

Ser Ala Glu Pro Lys Asp Val Gln Glu Thr Val Phe Ser Val Asp Pro
465 470 475 480

Val Gly Asn Asn Val Gly Arg Asp Gly Glu Pro Gly Val Phe Ile Ala
485 490 495

Glu Ala Val Arg Pro Ser Glu Asn Phe Glu Thr Asn Asp Tyr Ala Ile
500 505 510

Arg Ala Gly Val Ser Glu Ser Ser Val Asp Glu Thr Thr Val Glu Met
515 520 525

Ser Val Ala Asp Met Leu Lys Glu Ala Ser Val Lys Ile Leu Ala Ala
530 535 540

Gly Val Ala Ile Gly Leu Ile Ser Leu Phe Ser Gln Lys Tyr Phe Leu
545 550 555 560

Lys Ser Ser Ser Ser Phe Gln Arg Lys Asp Met Val Ser Ser Met Glu
565 570 575

Ser Asp

<210> 124
<211> 99
<212> PRT
<213> Solanum tuberosum

<400> 124

Pro Ser Asp His His Ile Ser Met Pro Ile Asp Phe Tyr Arg Val Leu
1 5 10 15

Gly Ala Glu Ala His Phe Leu Gly Asp Gly Ile Arg Arg Cys Tyr Asp
20 25 30

Ala Arg Ile Thr Lys Pro Pro Gln Tyr Gly Tyr Ser Gln Glu Ala Leu
35 40 45

Ile Gly Arg Arg Gln Ile Leu Gln Ala Ala Cys Glu Thr Leu Ala Asp
50 55 60

Ser Thr Ser Arg Arg Glu Tyr Asn Gln Gly Leu Ala Gln His Glu Phe
65 70 75 80

Asp Thr Ile Leu Thr Pro Val Pro Trp Asp Lys Val Pro Gly Ala Met
85 90 95

Cys Val Leu

<210> 125
<211> 760
<212> PRT
<213> Oryza sativa

<400> 125

Met Glu Gly Phe His Asn Leu Leu Ala Arg Pro Asn Ser Ala Pro Phe
1 5 10 15

Ala Phe Ser Leu Pro Arg Pro Arg Pro Arg Pro Arg Arg Arg Pro Pro
20 25 30

Pro His Pro Ser Ala Ala Cys Arg Ala Ala Ser Arg Trp Ala Glu Arg
35 40 45

Leu Phe Ala Asp Phe His Leu Leu Pro Thr Ala Ala Pro Ser Asp Pro
50 55 60

```
Pro Ser Pro Ala Pro Ala Pro Ala Ala Ala Pro Ser Ala Ser Pro Phe
65                  70                  75                  80

Val Pro Leu Phe Pro Asp Ala Ala Glu Arg Ser Leu Pro Leu Gln Val
                85                  90                  95

Asp Phe Tyr Lys Val Leu Gly Ala Glu Pro His Phe Leu Gly Asp Gly
            100                 105                 110

Ile Arg Arg Ala Phe Glu Ala Arg Ile Ala Lys Pro Pro Gln Tyr Gly
        115                 120                 125

Tyr Ser Thr Asp Ala Leu Val Gly Arg Arg Gln Met Leu Gln Ile Ala
    130                 135                 140

His Asp Thr Leu Met Asn Gln Asn Ser Arg Thr Gln Tyr Asp Arg Ala
145                 150                 155                 160

Leu Ser Glu Asn Arg Glu Glu Ala Leu Thr Met Asp Ile Ala Trp Asp
                165                 170                 175

Lys Glu Ala Gly Glu Ala Leu Ala Val Leu Val Thr Gly Glu Gln Leu
            180                 185                 190

Leu Leu Asp Arg Pro Pro Lys Arg Phe Lys Gln Asp Val Val Leu Ala
        195                 200                 205

Met Ala Leu Ala Tyr Val Asp Leu Ser Arg Asp Ala Met Ala Ala Ser
    210                 215                 220

Pro Pro Asp Val Ile Gly Cys Cys Glu Val Leu Glu Arg Ala Leu Lys
225                 230                 235                 240

Leu Leu Gln Glu Asp Gly Ala Ser Asn Leu Ala Pro Asp Leu Leu Ser
                245                 250                 255

Gln Ile Asp Glu Thr Leu Glu Glu Ile Thr Pro Arg Cys Val Leu Glu
            260                 265                 270

Leu Leu Ser Leu Pro Ile Asp Thr Glu His His Lys Lys Arg Gln Glu
        275                 280                 285

Gly Leu Gln Gly Ala Arg Asn Ile Leu Trp Ser Val Gly Arg Gly Gly
    290                 295                 300
```

Ile Ala Thr Val Gly Gly Gly Phe Ser Arg Glu Ala Phe Met Asn Glu
305 310 315 320

Ala Phe Leu Arg Met Thr Ser Ile Glu Gln Met Asp Phe Phe Ser Lys
325 330 335

Thr Pro Asn Ser Ile Pro Pro Glu Trp Phe Glu Ile Tyr Asn Val Ala
340 345 350

Leu Ala His Val Ala Gln Ala Ile Ile Ser Lys Arg Pro Gln Phe Ile
355 360 365

Met Met Ala Asp Asp Leu Phe Glu Gln Leu Gln Lys Phe Asn Ile Gly
370 375 380

Ser His Tyr Ala Tyr Asp Asn Glu Met Asp Leu Ala Leu Glu Arg Ala
385 390 395 400

Phe Cys Ser Leu Leu Val Gly Asp Val Ser Lys Cys Arg Met Trp Leu
405 410 415

Gly Ile Asp Asn Glu Ser Ser Pro Tyr Arg Asp Pro Lys Ile Leu Glu
420 425 430

Phe Ile Val Thr Asn Ser Ser Ile Ser Glu Glu Asn Asp Leu Leu Pro
435 440 445

Gly Leu Cys Lys Leu Leu Glu Thr Trp Leu Ile Phe Glu Val Phe Pro
450 455 460

Arg Ser Arg Asp Thr Arg Gly Met Gln Phe Arg Leu Gly Asp Tyr Tyr
465 470 475 480

Asp Asp Pro Glu Val Leu Ser Tyr Leu Glu Arg Met Glu Gly Gly Gly
485 490 495

Ala Ser His Leu Ala Ala Ala Ala Ala Ile Ala Lys Leu Gly Ala Gln
500 505 510

Ala Thr Ala Ala Leu Gly Thr Val Lys Ser Asn Ala Ile Gln Ala Phe
515 520 525

```
Asn Lys Val Phe Pro Leu Ile Glu Gln Leu Asp Arg Ser Ala Met Glu
    530                 535                 540

Asn Thr Lys Asp Gly Pro Gly Gly Tyr Leu Glu Asn Phe Asp Gln Glu
545                 550                 555                 560

Asn Ala Pro Ala His Asp Ser Arg Asn Ala Ala Leu Lys Ile Ile Ser
                565                 570                 575

Ala Gly Ala Leu Phe Ala Leu Leu Ala Val Ile Gly Ala Lys Tyr Leu
            580                 585                 590

Pro Arg Lys Arg Pro Leu Ser Ala Ile Arg Ser Glu His Gly Ser Val
        595                 600                 605

Ala Val Ala Asn Ser Val Asp Ser Thr Asp Asp Pro Ala Leu Asp Glu
    610                 615                 620

Asp Pro Val His Ile Pro Arg Met Asp Ala Lys Leu Ala Glu Asp Ile
625                 630                 635                 640

Val Arg Lys Trp Gln Ser Ile Lys Ser Lys Ala Leu Gly Pro Glu His
                645                 650                 655

Ser Val Ala Ser Leu Gln Glu Val Leu Asp Gly Asn Met Leu Lys Val
            660                 665                 670

Trp Thr Asp Arg Ala Ala Glu Ile Glu Arg His Gly Trp Phe Trp Glu
        675                 680                 685

Tyr Thr Leu Ser Asp Val Thr Ile Asp Ser Ile Thr Ile Ser Leu Asp
    690                 695                 700

Gly Arg Arg Ala Thr Val Glu Ala Thr Ile Asp Glu Ala Gly Gln Leu
705                 710                 715                 720

Thr Asp Val Thr Glu Pro Arg Asn Asn Asp Ser Tyr Asp Thr Lys Tyr
                725                 730                 735
```

Thr Thr Arg Tyr Glu Met Ala Phe Ser Lys Leu Gly Gly Trp Lys Ile
740 745 750

Thr Glu Gly Ala Val Leu Lys Ser
755 760

<210> 126
<211> 2283
<212> DNA
<213> Oryza sativa

<400> 126
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cctcgcccgc gcccgcgccc gcgccgcagg ccgccgcctc acccctccgc tgcctgccgc 120

gccgcgagcc gctgggccga acgcctcttc gccgacttcc acctcctccc caccgccgcg 180

ccctccgacc cgccgtcccc ggccccggcc ccggccgccg cgccctccgc ctccccccttc 240

gtcccgctct tccccgacgc cgccgaacgc tccctcccgc tccaagtcga tttctacaag 300

gttctagggg cagagccaca tttccttggc gatggcatca ggagggcgtt cgaggcacgg 360

atagccaagc caccgcagta tggctacagc acggatgctc ttgttggtcg tcgacaaatg 420

ctgcagattg cccatgacac tctcatgaac cagaactccc gcactcagta tgatcgtgcg 480

ctttctgaga accgtgaaga agctctcacc atggatattg cttgggacaa ggaggctggg 540

gaggcacttg ctgtgcttgt aactggagaa cagttgcttc tggatcggcc acccaagcgc 600

ttcaagcagg acgtggtgct agcgatggct ctggcttatg tggatctatc aagggatgct 660

atggcagcaa gccctccaga tgtaattggc tgctgcgagg tgctcgagag ggctctcaag 720

ctcttgcagg aagatggagc aagcaatctc gcacctgatc tgctttcaca gattgatgaa 780

actctcgagg agattacacc tcgctgtgta ttggagcttc tctcccttcc tattgacaca 840

gagcatcata agaagcgcca agaagggctt caaggtgcga gaaacatttt gtggagcgtt 900

ggcagaggag gtattgctac cgttggagga ggattttctc gtgaagcctt catgaacgag 960

gctttttga ggatgacatc aattgaacag atggatttct tttcaaaaac accgaatagc 1020

attcctcctg aatggtttga aatttacaat gtagcacttg cacatgtcgc tcaagcaatt 1080

ataagtaaaa ggccacaatt catcatgatg gcggatgatc tttttgaaca actccagaag 1140

ttcaacatag gttctcatta tgcttatgat aatgagatgg accttgcatt ggaaagggca 1200

ttctgctcat tgctagtcgg agatgttagc aagtgcagaa tgtggcttgg aattgataat 1260

gagtcttcac catacagaga ccccaaaatt ctagagttta ttgtgaccaa ctctagcatc 1320

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gctgctgctg ctgctattgc aaaacttggt gctcaagcta cagctgcact tggtactgtg 1560

aaatcaaatg ctattcaagc gttcaacaag gtttttccat tgatagaaca gttagacagg 1620

tcagccatgg aaaatactaa agatggccct gggggatatc ttgaaaattt tgaccaggaa 1680

aatgcacctg ctcatgattc gagaaatgcc gccttgaaga ttatctctgc tggcgcactg 1740

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attaggagtg agcatggatc tgtggcagtt gctaatagtg tcgactctac tgatgatcct 1860

gcactagatg aagatccagt acatattcct agaatggatg cgaagctggc agaagatatt 1920

gttcgcaagt ggcagagtat caaatctaag gccttgggac cagaacattc ggttgcatca 1980

ttgcaagagg ttcttgatgg caacatgcta aaggtgtgga ctgaccgagc agcggagatt 2040

gagcgtcatg ggtggttctg ggagtataca ctatccgatg tgacgattga tagcatcact 2100

atctccctag atggtcgacg agcgactgtg gaggctacga ttgatgaggc aggccaactt 2160

actgatgtta ctgagcccag aaacaatgat tcatatgaca caaaatacac tacccggtat 2220

gagatggcct tctccaagct aggagggtgg aagataacgg aaggagcagt cctcaagtcg 2280

tag 2283

<210> 127
<211> 801
<212> PRT
<213> Arabidopsis thaliana

<400> 127

Met Glu Ala Leu Ser His Val Gly Ile Gly Leu Ser Pro Phe Gln Leu
1 5 10 15

Cys Arg Leu Pro Pro Ala Thr Thr Lys Leu Arg Arg Ser His Asn Thr
20 25 30

Ser Thr Thr Ile Cys Ser Ala Ser Lys Trp Ala Asp Arg Leu Leu Ser
35 40 45

Asp Phe Asn Phe Thr Ser Asp Ser Ser Ser Ser Ser Phe Ala Thr Ala
50 55 60

Thr Thr Thr Ala Thr Leu Val Ser Pro Pro Pro Ser Ile Asp Arg Pro
65 70 75 80

Glu Arg His Val Pro Ile Pro Ile Asp Phe Tyr Gln Val Leu Gly Ala
85 90 95

Gln Thr His Phe Leu Thr Asp Gly Ile Arg Arg Ala Phe Glu Ala Arg
100 105 110

Val Ser Lys Pro Pro Gln Phe Gly Phe Ser Asp Asp Ala Leu Ile Ser
115 120 125

Arg Arg Gln Ile Leu Gln Ala Ala Cys Glu Thr Leu Ser Asn Pro Arg
130 135 140

Ser Arg Arg Glu Tyr Asn Glu Gly Leu Leu Asp Asp Glu Glu Ala Thr
145 150 155 160

Val Ile Thr Asp Val Pro Trp Asp Lys Val Pro Gly Ala Leu Cys Val
165 170 175

Leu Gln Glu Gly Gly Glu Thr Glu Ile Val Leu Arg Val Gly Glu Ala
180 185 190

Leu Leu Lys Glu Arg Leu Pro Lys Ser Phe Lys Gln Asp Val Val Leu
195 200 205

Val Met Ala Leu Ala Phe Leu Asp Val Ser Arg Asp Ala Met Ala Leu
210 215 220

Asp Pro Pro Asp Phe Ile Thr Gly Tyr Glu Phe Val Glu Glu Ala Leu
225 230 235 240

Lys Leu Leu Gln Glu Glu Gly Ala Ser Ser Leu Ala Pro Asp Leu Arg
245 250 255

Ala Gln Ile Asp Glu Thr Leu Glu Glu Ile Thr Pro Arg Tyr Val Leu
260 265 270

Glu Leu Leu Gly Leu Pro Leu Gly Asp Asp Tyr Ala Ala Lys Arg Leu
275 280 285

Asn Gly Leu Ser Gly Val Arg Asn Ile Leu Trp Ser Val Gly Gly Gly
290 295 300

```
Gly Ala Ser Ala Leu Val Gly Gly Leu Thr Arg Glu Lys Phe Met Asn
305                 310                 315                 320

Glu Ala Phe Leu Arg Met Thr Ala Ala Glu Gln Val Asp Leu Phe Val
                325                 330                 335

Ala Thr Pro Ser Asn Ile Pro Ala Glu Ser Phe Glu Val Tyr Glu Val
            340                 345                 350

Ala Leu Ala Leu Val Ala Gln Ala Phe Ile Gly Lys Lys Pro His Leu
        355                 360                 365

Leu Gln Asp Ala Asp Lys Gln Phe Gln Gln Leu Gln Gln Ala Lys Val
    370                 375                 380

Met Ala Met Glu Ile Pro Ala Met Leu Tyr Asp Thr Arg Asn Asn Trp
385                 390                 395                 400

Glu Ile Asp Phe Gly Leu Glu Arg Gly Leu Cys Ala Leu Leu Ile Gly
                405                 410                 415

Lys Val Asp Glu Cys Arg Met Trp Leu Gly Leu Asp Ser Glu Asp Ser
            420                 425                 430

Gln Tyr Arg Asn Pro Ala Ile Val Glu Phe Val Leu Glu Asn Ser Asn
        435                 440                 445

Arg Asp Asp Asn Asp Asp Leu Pro Gly Leu Cys Lys Leu Leu Glu Thr
    450                 455                 460

Trp Leu Ala Gly Val Val Phe Pro Arg Phe Arg Asp Thr Lys Asp Lys
465                 470                 475                 480

Lys Phe Lys Leu Gly Asp Tyr Tyr Asp Asp Pro Met Val Leu Ser Tyr
                485                 490                 495

Leu Glu Arg Val Glu Val Val Gln Gly Ser Pro Leu Ala Ala Ala Ala
            500                 505                 510
```

Ala Met Ala Arg Ile Gly Ala Glu His Val Lys Ala Ser Ala Met Gln
515 520 525

Ala Leu Gln Lys Val Phe Pro Ser Arg Tyr Thr Asp Arg Asn Ser Ala
530 535 540

Glu Pro Lys Asp Val Gln Glu Thr Val Phe Ser Val Asp Pro Val Gly
545 550 555 560

Asn Asn Val Gly Arg Asp Gly Glu Pro Gly Val Phe Ile Ala Glu Ala
565 570 575

Val Arg Pro Ser Glu Asn Phe Glu Thr Asn Asp Tyr Ala Ile Arg Ala
580 585 590

Gly Val Ser Glu Ser Ser Val Asp Glu Thr Thr Val Glu Met Ser Val
595 600 605

Ala Asp Met Leu Lys Glu Ala Ser Val Lys Ile Leu Ala Ala Gly Val
610 615 620

Ala Ile Gly Leu Ile Ser Leu Phe Ser Gln Lys Tyr Phe Leu Lys Ser
625 630 635 640

Ser Ser Ser Phe Gln Arg Lys Asp Met Val Ser Ser Met Glu Ser Asp
645 650 655

Val Ala Thr Ile Gly Ser Val Arg Ala Asp Asp Ser Glu Ala Leu Pro
660 665 670

Arg Met Asp Ala Arg Thr Ala Glu Asn Ile Val Ser Lys Trp Gln Lys
675 680 685

Ile Lys Ser Leu Ala Phe Gly Pro Asp His Arg Ile Glu Met Leu Pro
690 695 700

Glu Val Leu Asp Gly Arg Met Leu Lys Ile Trp Thr Asp Arg Ala Ala
705 710 715 720

```
Glu Thr Ala Gln Leu Gly Leu Val Tyr Asp Tyr Thr Leu Leu Lys Leu
                725                 730                 735

Ser Val Asp Ser Val Thr Val Ser Ala Asp Gly Thr Arg Ala Leu Val
            740                 745                 750

Glu Ala Thr Leu Glu Glu Ser Ala Cys Leu Ser Asp Leu Val His Pro
        755                 760                 765

Glu Asn Asn Ala Thr Asp Val Arg Thr Tyr Thr Thr Arg Tyr Glu Val
    770                 775                 780

Phe Trp Ser Lys Ser Gly Trp Lys Ile Thr Glu Gly Ser Val Leu Ala
785                 790                 795                 800

Ser
```

<210> 128
<211> 2406
<212> DNA
<213> Arabidopsis thaliana

<400> 128

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aaatgggccg accgtcttct ctccgacttc aatttcacct ccgattcctc ctcctcctcc    180

ttcgccaccg ccaccaccac cgccactctc gtctctccgc caccatctat tgatcgtccc    240

gaacgccacg tccccatccc cattgatttc taccaggtat taggagctca aacacatttc    300

ttaaccgatg gaatcagaag agcattcgaa gctagggttt cgaaaccgcc gcaattcggt    360

ttcagcgacg acgctttaat cagccggaga cagattcttc aagctgcttg cgaaactctg    420

tctaatcctc ggtctagaag agagtacaat gaaggtcttc ttgatgatga agaagctaca    480

gtcatcactg atgttccttg ggataaggtt cctggtgctc tctgtgtatt gcaagaaggt    540

ggtgagactg agatagttct tcgggttggt gaggctctgc ttaaggagag gttgcctaag    600

tcgtttaagc aagatgtggt tttagttatg gcgcttgcgt ttctcgatgt ctcgagggat    660

gctatggcat tggatccacc tgattttata actggttatg agtttgttga ggaagctttg    720

aagcttttac aggaggaagg agcaagtagc cttgcaccgg atttacgtgc acaaattgat    780

gagactttgg aagagatcac tccgcgttat gtcttggagc tacttggctt accgcttggt    840
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gatgattacg ctgcgaaaag actaaatggt ttaagcggtg tgcggaatat tttgtggtct 900

gttggaggag gtggagcatc agctcttgtt gggggtttga cccgtgagaa gtttatgaat 960

gaggcgtttt tacgaatgac agctgctgag caggttgatc tttttgtagc taccccaagc 1020

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tttattggta agaagccaca ccttttacag gatgctgata agcaattcca gcaacttcag 1140

caggctaagg taatggctat ggagattcct gcgatgttgt atgatacacg gaataattgg 1200

gagatagact tcggtctaga aaggggactc tgtgcactgc ttataggcaa agttgatgaa 1260

tgccgtatgt ggttgggctt agacagtgag gattcacaat ataggaatcc agctattgtg 1320

gagtttgttt tggagaattc aaatcgtgat gacaatgatg atctccctgg actatgcaaa 1380

ttgttggaaa cctggttggc aggggttgtc tttcctaggt tcagagacac caaagataaa 1440

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agaaactcgg ctgaacccaa ggatgtgcaa gagacagtgt ttagtgtaga tcctgttggt 1680

aacaatgtag gccgtgatgg tgagcctggt gtctttattg cagaagctgt aagaccctct 1740

gaaaactttg aaactaatga ttatgcaatt cgagctgggg tctcagagag tagcgttgat 1800

gaaactactg ttgaaatgtc cgttgctgat atgttaaagg aggcaagtgt gaagatccta 1860

gctgctggtg tggcaattgg actgatttca ctgttcagcc agaagtattt tcttaaaagc 1920

agctcatctt ttcaacgcaa ggatatggtt tcttctatgg aatctgatgt cgctaccata 1980

gggtcagtca gagctgacga ttcagaagca cttcccagaa tggatgctag gactgcagag 2040

aatatagtat ccaagtggca gaagattaag tctctggctt ttgggcctga tcaccgcata 2100

gaaatgttac cagaggtttt ggatgggcga atgctgaaga tttggactga cagagcagct 2160

gaaactgcgc agcttgggtt ggtttatgat tatacactgt tgaaactatc tgttgacagt 2220

gtgacagtct cagcagatgg aacccgtgct ctggtggaag caactctgga ggagtctgct 2280

tgtctatctg atttggttca tccagaaaac aatgctactg atgtcagaac ctacacaaca 2340

agatacgaag ttttctggtc caagtcaggg tggaaaatca ctgaaggctc tgttcttgca 2400

tcataa 2406

<210> 129
<211> 801
<212> PRT
<213> Arabidopsis thaliana

<400> 129

Met Glu Ala Leu Ser His Val Gly Ile Gly Leu Ser Pro Phe Gln Leu
1 5 10 15

Cys Arg Leu Pro Pro Ala Thr Thr Lys Leu Arg Arg Ser His Asn Thr
20 25 30

Ser Thr Thr Ile Cys Ser Ala Ser Lys Trp Ala Asp Arg Leu Leu Ser
35 40 45

Asp Phe Asn Phe Thr Ser Asp Ser Ser Ser Ser Ser Phe Ala Thr Ala
50 55 60

Thr Thr Thr Ala Thr Leu Val Ser Pro Pro Pro Ser Ile Asp Arg Pro
65 70 75 80

Glu Arg His Val Pro Ile Pro Ile Asp Phe Tyr Gln Val Leu Gly Ala
85 90 95

Gln Thr His Phe Leu Thr Asp Gly Ile Arg Arg Ala Phe Glu Ala Arg
100 105 110

Val Ser Lys Pro Pro Gln Phe Gly Phe Ser Asp Asp Ala Leu Ile Ser
115 120 125

Arg Arg Gln Ile Leu Gln Ala Ala Cys Glu Thr Leu Ser Asn Pro Arg
130 135 140

Ser Arg Arg Glu Tyr Asn Glu Gly Leu Leu Asp Asp Glu Glu Ala Thr
145 150 155 160

Val Ile Thr Asp Val Pro Trp Asp Lys Val Pro Gly Ala Leu Cys Val
165 170 175

Leu Gln Glu Gly Gly Glu Thr Glu Ile Val Leu Arg Val Gly Glu Ala
180 185 190

Leu Leu Lys Glu Arg Leu Pro Lys Ser Phe Lys Gln Asp Val Val Leu
195 200 205

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Val Met Ala Leu Ala Phe Leu Asp Val Ser Arg Asp Ala Met Ala Leu
    210                 215                 220

Asp Pro Pro Asp Phe Ile Thr Gly Tyr Glu Phe Val Glu Glu Ala Leu
225                 230                 235                 240

Lys Leu Leu Gln Glu Glu Gly Ala Ser Ser Leu Ala Pro Asp Leu Arg
                245                 250                 255

Ala Gln Ile Asp Glu Thr Leu Glu Glu Ile Thr Pro Arg Tyr Val Leu
            260                 265                 270

Glu Leu Leu Gly Leu Pro Leu Gly Asp Asp Tyr Ala Ala Lys Arg Leu
        275                 280                 285

Asn Gly Leu Ser Gly Val Arg Asn Ile Leu Trp Ser Val Gly Gly Gly
    290                 295                 300

Gly Ala Ser Ala Leu Val Gly Gly Leu Thr Arg Glu Lys Phe Met Asn
305                 310                 315                 320

Glu Ala Phe Leu Arg Met Thr Ala Ala Glu Gln Val Asp Leu Phe Val
                325                 330                 335

Ala Thr Pro Ser Asn Ile Pro Ala Glu Ser Phe Glu Val Tyr Glu Val
            340                 345                 350

Ala Leu Ala Leu Val Ala Gln Ala Phe Ile Gly Lys Lys Pro His Leu
        355                 360                 365

Leu Gln Asp Ala Asp Lys Gln Phe Gln Gln Leu Gln Gln Ala Lys Val
    370                 375                 380

Met Ala Met Glu Ile Pro Ala Met Leu Tyr Asp Thr Arg Asn Asn Trp
385                 390                 395                 400

Glu Ile Asp Phe Gly Leu Glu Arg Gly Leu Cys Ala Leu Leu Ile Gly
                405                 410                 415

Lys Val Asp Glu Cys Arg Met Trp Leu Gly Leu Asp Ser Glu Asp Ser
            420                 425                 430
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Gln Tyr Arg Asn Pro Ala Ile Val Glu Phe Val Leu Glu Asn Ser Asn
        435                 440                 445

Arg Asp Asp Asn Asp Asp Leu Pro Gly Leu Cys Lys Leu Leu Glu Thr
    450                 455                 460

Trp Leu Ala Gly Val Val Phe Pro Arg Phe Arg Asp Thr Lys Asp Lys
465                 470                 475                 480

Lys Phe Lys Leu Gly Asp Tyr Tyr Asp Asp Pro Met Val Leu Ser Tyr
                485                 490                 495

Leu Glu Arg Val Glu Val Val Gln Gly Ser Pro Leu Ala Ala Ala Ala
            500                 505                 510

Ala Met Ala Arg Ile Gly Ala Glu His Val Lys Ala Ser Ala Met Gln
        515                 520                 525

Ala Leu Gln Lys Val Phe Pro Ser Arg Tyr Thr Asp Arg Asn Ser Ala
    530                 535                 540

Glu Pro Lys Asp Val Gln Glu Thr Val Phe Ser Val Asp Pro Val Gly
545                 550                 555                 560

Asn Asn Val Gly Arg Asp Gly Glu Pro Gly Val Phe Ile Ala Glu Ala
                565                 570                 575

Val Arg Pro Ser Glu Asn Phe Glu Thr Asn Asp Tyr Ala Ile Arg Ala
            580                 585                 590

Gly Val Ser Glu Ser Ser Val Asp Glu Thr Thr Val Glu Met Ser Val
        595                 600                 605

Ala Asp Met Leu Lys Glu Ala Ser Val Lys Ile Leu Ala Ala Gly Val
    610                 615                 620

Ala Ile Gly Leu Ile Ser Leu Phe Ser Gln Lys Tyr Phe Leu Lys Ser
625                 630                 635                 640

Ser Ser Ser Phe Gln Arg Lys Asp Met Val Ser Ser Met Glu Ser Asp
                645                 650                 655
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Val Ala Thr Ile Gly Ser Val Arg Ala Asp Asp Ser Glu Ala Leu Pro
            660                 665                 670

Arg Met Asp Ala Arg Thr Ala Glu Asn Ile Val Ser Lys Trp Gln Lys
        675                 680                 685

Ile Lys Ser Leu Ala Phe Gly Pro Asp His Arg Ile Glu Met Leu Pro
    690                 695                 700

Glu Val Leu Asp Gly Arg Met Leu Lys Ile Trp Thr Asp Arg Ala Ala
705                 710                 715                 720

Glu Thr Ala Gln Leu Gly Leu Val Tyr Asp Tyr Thr Leu Leu Lys Leu
                725                 730                 735

Ser Val Asp Ser Val Thr Val Ser Ala Asp Gly Thr Arg Ala Leu Val
            740                 745                 750

Glu Ala Thr Leu Glu Glu Ser Ala Cys Leu Ser Asp Leu Val His Pro
        755                 760                 765

Glu Asn Asn Ala Thr Asp Val Arg Thr Tyr Thr Thr Arg Tyr Glu Val
    770                 775                 780

Phe Trp Ser Lys Ser Gly Trp Lys Ile Thr Glu Gly Ser Val Leu Ala
785                 790                 795                 800

Ser
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<210> 130
<211> 2637
<212> DNA
<213> Arabidopsis thaliana

<400> 130

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ttcaatatgt aaaacagaac aaagtttttg tagtagccta aaaagacact cccatggaag    120

ctctgagtca cgtcggcatt ggtctctccc cattccaatt atgccgatta ccaccggcga    180

cgacaaagct ccgacgtagc cacaacacct ctacaactat ctgctccgcc agcaaatggg    240

ccgaccgtct tctctccgac ttcaatttca cctccgattc ctcctcctcc tccttcgcca    300

ccgccaccac caccgccact ctcgtctctc cgccaccatc tattgatcgt cccgaacgcc    360
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acgtccccat ccccattgat ttctaccagg tattaggagc tcaaacacat ttcttaaccg 420

atggaatcag aagagcattc gaagctaggg tttcgaaacc gccgcaattc ggtttcagcg 480

acgacgcttt aatcagccgg agacagattc ttcaagctgc ttgcgaaact ctgtctaatc 540

ctcggtctag aagagagtac aatgaaggtc ttcttgatga tgaagaagct acagtcatca 600

ctgatgttcc ttgggataag gttcctggtg ctctctgtgt attgcaagaa ggtggtgaga 660

ctgagatagt tcttcgggtt ggtgaggctc tgcttaagga gaggttgcct aagtcgttta 720

agcaagatgt ggttttagtt atggcgcttg cgtttctcga tgtctcgagg gatgctatgg 780

cattggatcc acctgatttt ataactggtt atgagtttgt tgaggaagct ttgaagcttt 840

tacaggagga aggagcaagt agccttgcac cggatttacg tgcacaaatt gatgagactt 900

tggaagagat cactccgcgt tatgtcttgg agctacttgg cttaccgctt ggtgatgatt 960

acgctgcgaa aagactaaat ggtttaagcg gtgtgcggaa tattttgtgg tctgttggag 1020

gaggtggagc atcagctctt gttgggggtt tgacccgtga gaagtttatg aatgaggcgt 1080

ttttacgaat gacagctgct gagcaggttg atctttttgt agctacccca agcaatattc 1140

cagcagagtc atttgaagtt tacgaagttg cacttgctct tgtggctcaa gcttttattg 1200

gtaagaagcc acacctttta caggatgctg ataagcaatt ccagcaactt cagcaggcta 1260

aggtaatggc tatggagatt cctgcgatgt tgtatgatac acggaataat tgggagatag 1320

acttcggtct agaaagggga ctctgtgcac tgcttatagg caaagttgat gaatgccgta 1380

tgtggttggg cttagacagt gaggattcac aatataggaa tccagctatt gtggagtttg 1440

ttttggagaa ttcaaatcgt gatgacaatg atgatctccc tggactatgc aaattgttgg 1500

aaacctggtt ggcaggggtt gtctttccta ggttcagaga caccaaagat aaaaaattta 1560

aactcgggga ctactatgat gatcctatgg ttttgagtta cttggaaaga gtggaggtag 1620

ttcagggttc tcctttagct gctgctgcag ctatggcaag gattggagcc gagcatgtga 1680

aagctagtgc tatgcaggca ctgcagaaag tttttccttc ccgctataca gatagaaact 1740

cggctgaacc caaggatgtg caagagacag tgtttagtgt agatcctgtt ggtaacaatg 1800

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ttgaaactaa tgattatgca attcgagctg gggtctcaga gagtagcgtt gatgaaacta 1920

ctgttgaaat gtccgttgct gatatgttaa aggaggcaag tgtgaagatc ctagctgctg 1980

gtgtggcaat tggactgatt tcactgttca gccagaagta ttttcttaaa agcagctcat 2040

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tcagagctga cgattcagaa gcacttccca gaatggatgc taggactgca gagaatatag 2160

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taccagaggt tttggatggg cgaatgctga agatttggac tgacagagca gctgaaactg 2280

cgcagcttgg gttggtttat gattatacac tgttgaaact atctgttgac agtgtgacag 2340

tctcagcaga tggaacccgt gctctggtgg aagcaactct ggaggagtct gcttgtctat 2400

ctgatttggt tcatccagaa aacaatgcta ctgatgtcag aacctacaca acaagatacg 2460

aagttttctg gtccaagtca gggtggaaaa tcactgaagg ctctgttctt gcatcataat 2520

atactcatat gtagcatgtc tgagcttgcg agattctctt tgttttgtaa attctctctc 2580

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<210> 131
<211> 801
<212> PRT
<213> Arabidopsis thaliana

<400> 131

Met Glu Ala Leu Ser His Val Gly Ile Gly Leu Ser Pro Phe Gln Leu
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Cys Arg Leu Pro Pro Ala Thr Thr Lys Leu Arg Arg Ser His Asn Thr
20 25 30

Ser Thr Thr Ile Cys Ser Ala Ser Lys Trp Ala Asp Arg Leu Leu Ser
35 40 45

Asp Phe Asn Phe Thr Ser Asp Ser Ser Ser Ser Ser Phe Ala Thr Ala
50 55 60

Thr Thr Thr Ala Thr Leu Val Ser Pro Pro Pro Ser Ile Asp Arg Pro
65 70 75 80

Glu Arg His Val Pro Ile Pro Ile Asp Phe Tyr Gln Val Leu Gly Ala
85 90 95

Gln Thr His Phe Leu Thr Asp Gly Ile Arg Arg Ala Phe Glu Ala Arg
100 105 110

Val Ser Lys Pro Pro Gln Phe Gly Phe Ser Asp Asp Ala Leu Ile Ser
115 120 125

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Arg Arg Gln Ile Leu Gln Ala Ala Cys Glu Thr Leu Ser Asn Pro Arg
    130                 135                 140

Ser Arg Arg Glu Tyr Asn Glu Gly Leu Leu Asp Asp Glu Glu Ala Thr
145                 150                 155                 160

Val Ile Thr Asp Val Pro Trp Asp Lys Val Pro Gly Ala Leu Cys Val
                165                 170                 175

Leu Gln Glu Gly Gly Glu Thr Glu Ile Val Leu Arg Val Gly Glu Ala
            180                 185                 190

Leu Leu Lys Glu Arg Leu Pro Lys Ser Phe Lys Gln Asp Val Val Leu
        195                 200                 205

Val Met Ala Leu Ala Phe Leu Asp Val Ser Arg Asp Ala Met Ala Leu
    210                 215                 220

Asp Pro Pro Asp Phe Ile Thr Gly Tyr Glu Phe Val Glu Glu Ala Leu
225                 230                 235                 240

Lys Leu Leu Gln Glu Glu Gly Ala Ser Ser Leu Ala Pro Asp Leu Arg
                245                 250                 255

Ala Gln Ile Asp Glu Thr Leu Glu Glu Ile Thr Pro Arg Tyr Val Leu
            260                 265                 270

Glu Leu Leu Gly Leu Pro Leu Gly Asp Asp Tyr Ala Ala Lys Arg Leu
        275                 280                 285

Asn Gly Leu Ser Gly Val Arg Asn Ile Leu Trp Ser Val Gly Gly Gly
    290                 295                 300

Gly Ala Ser Ala Leu Val Gly Gly Leu Thr Arg Glu Lys Phe Met Asn
305                 310                 315                 320

Glu Ala Phe Leu Arg Met Thr Ala Ala Glu Gln Val Asp Leu Phe Val
                325                 330                 335

Ala Thr Pro Ser Asn Ile Pro Ala Glu Ser Phe Glu Val Tyr Glu Val
            340                 345                 350

Ala Leu Ala Leu Val Ala Gln Ala Phe Ile Gly Lys Lys Pro His Leu
        355                 360                 365
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Leu Gln Asp Ala Asp Lys Gln Phe Gln Gln Leu Gln Gln Ala Lys Val
    370                 375                 380

Met Ala Met Glu Ile Pro Ala Met Leu Tyr Asp Thr Arg Asn Asn Trp
385                 390                 395                 400

Glu Ile Asp Phe Gly Leu Glu Arg Gly Leu Cys Ala Leu Leu Ile Gly
                405                 410                 415

Lys Val Asp Glu Cys Arg Met Trp Leu Gly Leu Asp Ser Glu Asp Ser
            420                 425                 430

Gln Tyr Arg Asn Pro Ala Ile Val Glu Phe Val Leu Glu Asn Ser Asn
        435                 440                 445

Arg Asp Asp Asn Asp Asp Leu Pro Gly Leu Cys Lys Leu Leu Glu Thr
    450                 455                 460

Trp Leu Ala Gly Val Val Phe Pro Arg Phe Arg Asp Thr Lys Asp Lys
465                 470                 475                 480

Lys Phe Lys Leu Gly Asp Tyr Tyr Asp Asp Pro Met Val Leu Ser Tyr
                485                 490                 495

Leu Glu Arg Val Glu Val Val Gln Gly Ser Pro Leu Ala Ala Ala Ala
            500                 505                 510

Ala Met Ala Arg Ile Gly Ala Glu His Val Lys Ala Ser Ala Met Gln
        515                 520                 525

Ala Leu Gln Lys Val Phe Pro Ser Arg Tyr Thr Asp Arg Asn Ser Ala
    530                 535                 540

Glu Pro Lys Asp Val Gln Glu Thr Val Phe Ser Val Asp Pro Val Gly
545                 550                 555                 560

Asn Asn Val Gly Arg Asp Gly Glu Pro Gly Val Phe Ile Ala Glu Ala
                565                 570                 575

Val Arg Pro Ser Glu Asn Phe Glu Thr Asn Asp Tyr Ala Ile Arg Ala
            580                 585                 590
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Gly Val Ser Glu Ser Ser Val Asp Glu Thr Thr Val Glu Met Ser Val
595 600 605

Ala Asp Met Leu Lys Glu Ala Ser Val Lys Ile Leu Ala Ala Gly Val
610 615 620

Ala Ile Gly Leu Ile Ser Leu Phe Ser Gln Lys Tyr Phe Leu Lys Ser
625 630 635 640

Ser Ser Ser Phe Gln Arg Lys Asp Met Val Ser Ser Met Glu Ser Asp
645 650 655

Val Ala Thr Ile Gly Ser Val Arg Ala Asp Asp Ser Glu Ala Leu Pro
660 665 670

Arg Met Asp Ala Arg Thr Ala Glu Asn Ile Val Ser Lys Trp Gln Lys
675 680 685

Ile Lys Ser Leu Ala Phe Gly Pro Asp His Arg Ile Glu Met Leu Pro
690 695 700

Glu Val Leu Asp Gly Arg Met Leu Lys Ile Trp Thr Asp Arg Ala Ala
705 710 715 720

Glu Thr Ala Gln Leu Gly Leu Val Tyr Asp Tyr Thr Leu Leu Lys Leu
725 730 735

Ser Val Asp Ser Val Thr Val Ser Ala Asp Gly Thr Arg Ala Leu Val
740 745 750

Glu Ala Thr Leu Glu Glu Ser Ala Cys Leu Ser Asp Leu Val His Pro
755 760 765

Glu Asn Asn Ala Thr Asp Val Arg Thr Tyr Thr Thr Arg Tyr Glu Val
770 775 780

Phe Trp Ser Lys Ser Gly Trp Lys Ile Thr Glu Gly Ser Val Leu Ala
785 790 795 800

Ser

<210> 132
<211> 561
<212> DNA
<213> Arabidopsis thaliana

<220>
<221> misc_feature
<222> (127)..(127)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (520)..(520)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (541)..(541)
<223> n is a, c, g, or t

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ataaacacta acttagagag agaatttaca aaacaaagag aatctcgcaa gctcagacat 60

gctacatatg agtatattat gatgcaagaa cagagccttc agtgattttc caccctgact 120

tggaccngaa aacttcgtat cttgttgtgt aggttctgac atcagtagca ttgttttctg 180

gatgaaccaa atcagataga caagcagact cctccagagt tgcttccacc agagcacggg 240

ttccatctgc tgagactgtc acactgtcaa cagatagttt caacagtgta taatcataaa 300

ccaacccaag ctgcgcagtt tcagctgctc tgtcagtcca aatcttcagc attcgcccat 360

ccaaaacctc tggtaacatt tctatgcggt gatcaggccc aaaagccaga gacttaatct 420

tctgccactt ggatactata ttctctgcag tcctagcatc cattctggga agtgcttctg 480

aatcgtcagc tctgactgac cctatggtag cgacatcagn ttccatagaa gaaaccatat 540

ncttgcgttg aaaagatgag c 561

<210> 133
<211> 295
<212> DNA
<213> Medicago truncatula

<400> 133
ctggtgtagc aattggactc ataactttag ctggtttgaa gattttacct tctaaaaatg 60

gctcgcccgt tcttcacaaa gtgactggtt cagcaattgc gtcagatact atcaatttag 120

gtcctgtagg agatgaagaa ttaggagagc aactaccaaa aatgagtgca atggttgcag 180

aagctctagt ccgcaagtgg caatatatca catcccaagc ttttggacct gaccattgcc 240

taggaagatt gcaagaggtg ttggacggcc aaatgttgaa gatatggact gatcg 295

<210> 134
<211> 527
<212> DNA
<213> Medicago truncatula

<400> 134
cccaagcttt tggacctgac cattgcctag gaagattgca agaggtgttg gacggcgaaa 60

tgttgaagat atggactgat cgagcagctg agattgcaga gcttggttgg tcatatgact 120

acaacttgga ggatctcaac atcgacagtg tgaccatatc acagaatggg cggcgtgcag 180

tagtggaaac aactctcaaa gagtctaccc acctcactgc tgttggtcat ccacagcatg 240

ctacttccaa cagcagaacc tacacaacaa gatatgaaat gtctttttca gattcagggt 300

ggaaaattat tgaaggagct gtccttgagt cgtaattagg ttttgtaata tgtaatatat 360

gtcaggttag tacacttcaa tattaacccc ctcgagccta tgcccactgt cttgtatgta 420

cctgttgttt tgtgcatttt tcaagcattt atgtagtcag gctgtaaata cttggagggt 480

atttgatcaa ataattatcc ggttaaaaaa aaaaaaaaaa aaaaaaa 527

<210> 135
<211> 660
<212> DNA
<213> Medicago truncatula

<400> 135
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gggcggagcg actcatttcc gatttccaat tcctcggcga cacctcctct tcctcctcca 120

ccaccacctc cgccacagtc actctcactc cttcttaccc tcctccgata gaacgccacg 180

tgtcactccc tctcgacctg tacaaaatcc tcggcgccga aacgcatttt ctcggtgatg 240

gtattcggag agcttatgaa gcgaaattct cgaagcctcc tcagtatgct ttcagtaatg 300

aagctttgat tagtcgtcgt cagattcttc aagctgcttg tgaaacccta gctgatcctg 360

cttctagaag agagtataat caaagcctcg tcgacgatga agacgaagat gaggaatctt 420

ccattctcac tgaaatccct ttcgacaaag ttcctggagc tctgtgcgtg ttgcaagaag 480

ctggagagac ggagttggtg cttcggattg gaggggggttt actgagagag aggttaccga 540

agatgtttaa gcaagatgtt gtgttggcta tggcgcttgc atatgttgac gtttctaggg 600

atgctatggc tttgtccccg ccagatttca ttgttgcttg tgagatgctg gaaagggcat 660

<210> 136
<211> 187
<212> DNA
<213> Glycine max

<400> 136
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tttgcttagg gagaggttgc cgaagacgtt taagcaggat gttgtgttgg ctatggcact 120

cgcatttgtt gacgtgtcaa gggatgcttg gcttgttcac cggatttcat tgcggctgtg 180

agatgct 187

<210> 137
<211> 608
<212> DNA
<213> Solanum tuberosum

<400> 137
ggaaagcttc cttaacaatg gaggcattaa cacagctaag ctttggcatt tgtactccac 60

gcctttcatc accatttcaa ctagccgccg ccggtggtaa gaagccgccg agactcaatg 120

ccgttaacgg aggagctagt agtgttaccg gtggaacaag tagtttacct actaacttct 180

ccgctagtaa atgggcggat cgtcttctcg ccgatttcca attccttcct tccaccacca 240

cctccgactc atcggatttc cagaattcaa cttctacaac ctccgttacg actattcctc 300

ctcctgttgc tccttcagac caccacattt caatgcctat agacttttat agagtgcttg 360

gtgctgaagc tcacttcctc ggtgacggta ttaggagatg ctacgatgct agaattacaa 420

agcctccgca gtacggatac agtcaggaag cattgattgg ccgacggcag attcttcaag 480

ctgcttgtga aacccttgct gactctacct ctcgtagaga gtacaatcaa ggcctcgctc 540

agcatgagtt cgatactatt ctaactcctg tcccctggga taaagttccg ggagcaatgt 600

gtgttttg 608

<210> 138
<211> 307
<212> DNA
<213> Populus balsamifera

<400> 138
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gtcaccacgc caagtaatat cccggctcaa aattttgaag tttatggagt ggcacttgcc 120

cttgttgccc aagctttcat tggtaaaaag cctcatctca tcacagatgc tgataaccta 180

ttcggacagc ttcagcagat taaggtaaca aatcaaggga gtcttgttcc tgtctttggt 240

tccatggaaa accgtgatat tgactttggg ttggagaggg gctttgttca ctgcttgtag 300

gccagct 307

<210> 139
<211> 416
<212> DNA
<213> Mesembryanthemum crystallinum

<400> 139
gggaaacgtg ccttggtgga agcaactctt caagaatcag cgcagttaac tgacgttaac 60

caacctgagc ataacgattc ttacagcaga acatacacaa caaggtacga gatgtttcac 120

tccaatgctg ggtggaagat catagaggga gctgtcctcc aatcttaagc tgctggaaat 180

ccagtcttga atgtacatat tttcacatca tctgcacatt atgaatgaag gatggtatgt 240

gttttctgga cagtggtatt tgatcatgtt gtgtttattt tggtaacaag ttttgatcat 300

tatcaaaaag atcactcttg taagttagtt ttttccacaa taaatcaact atttatatga 360

aagtttttat atcaggacta cttgccttta cttatataaa ctttgagaaa tttttt 416

<210> 140
<211> 465
<212> DNA
<213> Oryza sativa

<220>
<221> misc_feature
<222> (113)..(113)
<223> n is a, c, g, or t

<400> 140
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ctgcacttgg tactgtgaaa tcaaatgcta ttcaagcgtt caacaaggtt ttnccattga 120

tagaacagtt agacaggtca gccatggaaa atactaaaga tggccctggg ggatatcttg 180

aaaattttga ccaggaaaat gcacctgctc atgattcgag aaatgccgcc ttgaagatta 240

tctctctggc gcactgtttg cactgttggc agtaattggg gccaaatatt tgcctcgtaa 300

gaggcccctt tctgctatta ggagtgagca tggatctgtg gcagttgcta atagtgtcga 360

ctctactgat gatcctgcac tagatgaaga tccagtacat attcctagaa tggatgcgaa 420

gctggcagaa gatattgttc gcaagtggca gagtatcaaa tctaa 465

<210> 141
<211> 309
<212> DNA
<213> Oryza sativa

<400> 141
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gaggaggtat tgctaccgtt ggaggaggat tttctcgtga agccttcatg aacgaggctt 120

ttttgaggat gacatcaatt gaacagatgg atttcttttc aaaaacaccg aatagcattc 180

ctcctgaatg gtttgaaatt tacaatgtag cacttgcaca tgtcgctcaa gcaattataa 240

gtaaaaggcc acaattcatc atgatggcgg atgatctttt tgaacaactc cagaagttcc 300

acataggtc 309

<210> 142
<211> 336
<212> DNA
<213> Oryza sativa

<400> 142
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gaggaggtat tgctaccgtt ggaggaggat tttctcgtga agccttcatg aacgaggctt 120

ttttgaggat gacatcaatt gaacagatgg atttcttttc aaaaacaccg aatagcattc 180

ctcctgaatg gtttgaaatt tacaatgtag cacttgcaca tgtcgctcaa gcaattataa 240

gtaaaaggcc acaattcatc atgatggcgg atgatctttt tgaacaactc cagaagttca 300

acataggttc tcattatgct tatgataatg agatgg 336

<210> 143
<211> 537
<212> DNA
<213> Triticum aestivum

<400> 143
cagtgcttgc aattggaggg cacttactgg aggaccgccc gcccaagcgg ttcaagcagg 60

atgtggtgct ggcaatggcg ctcgcttatg tggatctatc aagggacgca atggcggcta 120

gccctccaga tgtaatccgc tgctgtgagg tgcttgaaag ggctctcaag cttttgcagg 180

aggatggggc aatcaatctc gcacctggtt tgctctcaca aattgatgaa actctggagg 240

atatcacacc tcgttgtgtt ttggagcttc ttgcccttcc tcttgatgaa aaacatcaga 300

atgaacacca agaaggtctt cgtggtgtga gaaacatttt gtggagtgtt ggcagaggag 360

gtattggtac tgttggagga ggattttcgc gtgaagccta catgaatgaa gccttcctgc 420

agatgacatc ggcggagcag atggatttct tctcaaaaac accgaatagc ataccgcctg 480

aatggtttga aatctatagc gtggcacttg caaatgttgc tcaagcaatt gtaagta 537

<210> 144
<211> 418
<212> DNA
<213> Triticum monococcum

<220>
<221> misc_feature
<222> (144)..(144)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (301)..(301)
<223> n is a, c, g, or t

<400> 144
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cgccaagaag gtcttcgtgg tgtgagaaac attttgtgga gtgttggtag aggaggtatt 120

gctactgttg gaggaggatt ttcncgtgaa gcctacatga atgaggcctt tttgcagatg 180

acatcagcgg agcagatgga tttcttttca aaaacgccaa atagcatacc acctgaatgg 240

tttgaaatct atagtgtggc actcgcaaat gttgctcaag caattgtaag taaaaggcca 300

nagctcatca tggtggcaga tgatcttttc gaacagctcc agaagttcaa tataggttct 360

caatatgctt atgataatga attggatctt gtgttggaaa gggcactttg ctcattgc 418

<210> 145
<211> 480
<212> DNA
<213> Hordeum vulgare

<400> 145
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atgagcccat acagattcct aaaatggatg cgaagctggc agaagatatt gttcgcaagt 120

ggcagagcat caaatccaag gccttgggat cagatcattc tgttgcatca ttgcaagagg 180

ttcttgatgg caacatgctg aaggtatgga cggaccgagc agcagagatc gagcgcaaag 240

gctggttctg ggactacacg ctgtccaacg tggcgatcga cagcatcacc gtctccctgg 300

acggacggcg ggcgaccgtg gaggcgacaa ttgaggaggc gggtcagctc accgacgcaa 360

ccgaccccag gaacgatgat ttgtacgaca ctaagtacac cacccggtac gagatggcct 420

tcaccggacc aggagggtgg aagataaccg aaggcgcagt cctcaagtcg tcatagggcg 480

<210> 146
<211> 622
<212> DNA
<213> Hordeum vulgare

<220>
<221> misc_feature
<222> (11)..(12)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (14)..(14)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (65)..(65)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (88)..(88)
<223> n is a, c, g, or t

<400> 146
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cgagnaagca ccagagtaaa cgccaagnaa ggtcttcgtg gtgtgagaaa cattttgtgg 120

agtgttggta gaggaggtat tgctactgtt ggtggaggat tttcacggga agcctacatg 180

aatgaggcct ttttgcagat gacatcagct gagcagatgg atttcttttc aaaaacgccg 240

aatagcatac cacctgaatg gtttgaaatc tatagcgtgg cactcgcaaa tgttgctcaa 300

gcaattgtaa gtaaaaggcc agagctcatc atggtggcag atgatctttt cgaacagctc 360

cagaagttca atatcggttc tcaatatgct tatggtaacg agatggatct tgcgttggaa 420

agggcacttt gctcattgct tgtgggagac attagcaact gcagaacttg gcttgcgatt 480

gataatgaat cttcaccaca tagagacccg aaaattgtag agtttattgt gaacaactct 540

agcattgacc accaggagaa tgatcttctt ccaggcctgt gtaagctttt ggagacttgg 600

cttgtctcag aggttttccc ta 622

<210> 147
<211> 604
<212> DNA
<213> Hordeum vulgare

<220>
<221> misc_feature
<222> (13)..(13)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (516)..(516)
<223> n is a, c, g, or t

<400> 147
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agcctagcaa taatccgaat agaacacacc gaaaaacaaa gctcatcgct gactaactga 120

ctaaccaaac tatctccgtc ttccaaactg acaagagcct agactagact gcttatttac 180

acaccagaaa aacacgggag gaatcaatca acaaggttta ctgcacgctg aacgccctat 240

gacgacttga ggactgcgcc ttcggttatc ttccaccctc ctggtccggt gaaggccatc 300

tcgtaccggg tggtgtactt agtgtcgtac aaatcatcgt tcctggggtc ggttgcgtcg 360

gtgagctgac ccgcctcctc aattgtcgcc tccacggtcg cccgccgtcc gtccagggag 420

acggtgatgc tgtcgatcgc cacgttgaac agcgtgtagt cccagaacca gcctttgcgc 480

tcaatctctg ctgctcggtc tgtccatacc ttcagnatgt tgccatcaag aacctcttgc 540

aatgatgcaa cagaatgatc tgatcccaag gccttggatt tgatgctctg ccacttgcga 600

acaa 604

<210> 148
<211> 653
<212> DNA
<213> Sorghum bicolor

<400> 148
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gaaattccta gaatggatgc aaagttggct gaagatattg ttcgcaagtg gcaaagtatc 120

aagtccaagg ctttggggcc agaacacact gtcacggcat tgcaagagat cctcgatggc 180

aacatgctga aggtatggat ggaccgagcc acagagattg agcgtcacgg ttggttctgg 240

gaatacacac tctccgacgt gacgatcgac agtatcaccg tctccatgga cggtcgacgg 300

gcaactgtgg aggcgacgat tgaggagatg ggccaactta ccgacgtagc agacccaaag 360

aacaacgacg cctacgacac aaagtacacc gctcggtacg agatgagcta ctccaagtcc 420

ggagggtgga ggatcaccga aggagcagtc ctcaagtcgt agaacggtcg tgcagcagga 480

gtaggcgagt aggggttgct caactcccat tctttttttct tttgcaccag tgtatgtaaa 540

taaacagtgt gagcacaggt tcttttctct cctggagaga gtttggttag gttgattagt 600

gatgagttcc tgaggccgag agaatttgtc atctagtttg tattgataga gat 653

<210> 149
<211> 535
<212> DNA
<213> Sorghum bicolor

<400> 149
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aatctcttga aaaacttgcc caagaaatgt tgctggagat gctatccatg attccaaaaa 120

tgccgctttg aagattatct ctgctggtgc actgtttgca ctatttgcag taataggtct 180

gaagtgcttg cctcgtaaga agtcacttcc tgctcttaag agcgaatatg ggtctgtggc 240

agttgctgac tctgttgatg gtctgggagc agatgaagag ccactagaaa ttcctagaat 300

ggatgcaaag ttggctgaag atattgttcg caagtggcaa agtatcaagt ccaaggcttt 360

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atggatggac cgagccacag agattgagcg tcacggttgg ttctgggaat acacactctc 480

cgacgtgacg atcgacagta tcaccgtctc catggacggt cgacgggcaa ctgtg 535

<210> 150
<211> 479
<212> DNA
<213> Zea mays

<400> 150
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gcctcttcgc cgacttccac ctcctccccg ccgccgccga cccgccagcc gcggcctcct 120

cttcctcctc gtccccgttc gtcccgatct tccccgaagc cgccgaccgc gccttgcccc 180

tcccggtcga cttctacaag attcttggtg cggagccaca tttcctaggc gatggcattc 240

ggagggcgtt cgagtcgcgg atagctaagc cacctcagta tgggtacagc acagaagctc 300

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gcaccgagta cgaccgtgcg ctttccgagg accgtgatgc ggcactcacc atggatgttg 420

cctgggataa ggttccaggt gtgctgcgtg tgcttcagga ggctggggag gcacaactg 479

<210> 151
<211> 446
<212> DNA
<213> Zea mays

<400> 151
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gaaggcctca cgagaaaatc ctcctccaac agtagcaata ccacccctgc caacactcca 180

caatatgttt tttgcacctt gcagaccttc ttggcgttta tttttatgtt tttcatcagt 240

aggaagagca agaagctcca atacacaacg aggtgtaatc tcctccaaag tttcatcaat 300

ctgtgcaagc agttcaggtg caagattgct tgcaccatcc tcctgcagga gcttcagtgc 360

cctctcaagc acctcacaac agcagattac atctggaggg cttgctgcca tagcatccct 420

tgatatgtcc acataagcca atgcca 446

<210> 152
<211> 657
<212> DNA
<213> Zea mays

<400> 152
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ctcttttatc accagtcgtg tcaggaagca ttttgaaaat atatcaaaat ttctttggct 120

gagtgatagg cctaattcaa atagcaaagg aagtgataaa cacccagcgg ttaatgatat 180

tactgctgca gtttgcaagc aaaagatgga tattcaagaa gcagaaacac ttgtaaaaca 240

gtggcaagac ataaaatctg aagctcttgg ccctgactat caaactgaca tgctacctga 300

gattcttgat ggttcaatgc tctctaagtg ggaagactta gcgttattag caaaggacca 360

gtcttgctat tggagatttg tgctgctaaa tcttaatgtt gttcgagccg agataatctt 420

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gcttgttgac gattcccagc ccaagaaacc gagttattac agcacatatg aagttcagta 540

cgtattgagg aggcagaatc atggatcttg gaaaatctcc gaggctgctg tccgggacct 600

gacgtgattt ctgccaactc ggcaaacggg ctacacaacc attggcgtat aggcggc 657

<210> 153
<211> 871
<212> DNA
<213> Ceratopteris richardii

<400> 153
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ctcgaatgac agctgctgag caagtagctt tgttcacaaa tacacccagt aatatcccag 120

cagagagttc tgaggtttac acagttgcgc ttgctcacat agcagaggga tttgttgcaa 180

agaagccgca attgattcag gaagctgatt cactctttct tcagcttcag cgaacaaatg 240

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tggaaagttg gttgagggaa gcggtgtttt tccccaaccc gtcaacagaa aagtggaggt 540

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gcgggggcg ctatgaaaaa atatattcaa cctttttttg ttggggcgtc gtctacaaag 660

aatgatggag tgtcattgtt gcttttgagg tgacgaaggg gcggcgctcc tctttaaggg 720

atcgtccgtg ggggcgcgcg ctcccatatc gccatcttcg ggacaccttg ttcgtgggtc 780

aaatggtgat gtcttttta ccacgaacgt cacattattc ttataatata agcgtgcggc 840

agcactctca gcttcgacga aacagcctaa a 871

<210> 154
<211> 541
<212> DNA
<213> Physcomitrella patens

<400> 154
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tatggttcga agatggcaag cagctaaagc tcgagcactt ggttctgctc atgatatggc 120

ggctcttcct gaggtgctgg agggcgagat gctgaagagc tggacagacc gtgttagtga 180

cgtcaagaga aatggttggt tttgggaata cactctcctt ggtcttcaca ttgatagtgt 240

aacagtaagt gacgatggga ggcgagcaac tgcggaagcc actttgcaag aggcagcccg 300

cttggtggac cgcaacaacc ctgaccacaa tgattcttat agaagcactt acactacgcg 360

atatgacctc cggcatggca tagatggttg gcgaatcaat ggaggagctg tgctgcgtac 420

ttgattctga gattttcatc tccggatcat gttgacttgt aggcagatcg actagttgca 480

acccttgcat gctacgaatg agtagtcttt ttggatattt tgatccatca tgcagctttg 540

a 541

<210> 155
<211> 2109
<212> DNA
<213> Protochlorococcus marinus MED4

<400> 155
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gaaatattaa gggctttcca attacgcttg gataaaactc ctgatgaagg attcacgtac 120

gaggttttaa ctcaaaggtc ggaattgctt cgccttactg cagatttgct tacagatcca 180

gatagtagaa gagattacga aaatttatta ctaaatggag catcaggttt agatttatct 240

tccaatagag aggttgcagg attaattctc ctttgggaat cgggctcttc taaagaagcc 300

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gaagctgatc ttaccttgtt agcggcttta acatctagag atgctgcaat acaagagcaa 420

gatcaaagat cttactcaaa tgctgcagat tttttacaag aaggcataca gcttcttcaa 480

agaatgggca aactagggga attacggaaa actcttgagg aggacttagt gtcgcttctt 540

ccgtatcgaa ttcttgattt gttaagtaga gatctaaatg attatgactc gcataaaaaa 600

ggtttaagta tgctggaaaa tttaataatc aaaagaggtg gattagaagg aaaaaataaa 660

tctgaatata atgattttct aaatcagcaa gaatttgaat ctttctttca acaaataaag 720

ccattcttga ctgttcagga tcagatagat ttatttttag aattacaaaa aaggggttca 780

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gaaggtttaa atcaagatga taaaaagaaa gttctcgata actcaaaaat tattctctca 1680

gataatgcag aaaaagttat tttttcaggt gaagaaataa aaactgcttc tccctcctta 1740

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gaaagagaac ttgatattca aaaaggtatc tacaaaaata tcaatgctaa tatcgaaaat 1920

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gaaaaaatat taaaaataga tggggaattg ataaatgaaa caactttcac tccttttttg 2040

aaagttaaat atattttagg tttctcaaat aactcctgga aattagttga ctacattagt 2100

ggtgtttag 2109

<210> 156
<211> 702
<212> PRT
<213> Protochlorococcus marinus MED4

<400> 156

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20 25 30

Thr Pro Asp Glu Gly Phe Thr Tyr Glu Val Leu Thr Gln Arg Ser Glu
35 40 45

Leu Leu Arg Leu Thr Ala Asp Leu Leu Thr Asp Pro Asp Ser Arg Arg
50 55 60

Asp Tyr Glu Asn Leu Leu Leu Asn Gly Ala Ser Gly Leu Asp Leu Ser
65 70 75 80

Ser Asn Arg Glu Val Ala Gly Leu Ile Leu Leu Trp Glu Ser Gly Ser
85 90 95

Ser Lys Glu Ala Phe Lys Ile Thr Arg Lys Ala Leu Gln Pro Pro Gln
100 105 110

Thr Pro Ala Leu Gly Ser Ser Arg Glu Ala Asp Leu Thr Leu Leu Ala
115 120 125

Ala Leu Thr Ser Arg Asp Ala Ala Ile Gln Glu Gln Asp Gln Arg Ser
130 135 140

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Tyr Ser Asn Ala Ala Asp Phe Leu Gln Glu Gly Ile Gln Leu Leu Gln
145                 150                 155                 160

Arg Met Gly Lys Leu Gly Glu Leu Arg Lys Thr Leu Glu Glu Asp Leu
                165                 170                 175

Val Ser Leu Leu Pro Tyr Arg Ile Leu Asp Leu Leu Ser Arg Asp Leu
            180                 185                 190

Asn Asp Tyr Asp Ser His Lys Lys Gly Leu Ser Met Leu Glu Asn Leu
        195                 200                 205

Ile Ile Lys Arg Gly Gly Leu Glu Gly Lys Asn Lys Ser Glu Tyr Asn
    210                 215                 220

Asp Phe Leu Asn Gln Gln Glu Phe Glu Ser Phe Phe Gln Gln Ile Lys
225                 230                 235                 240

Pro Phe Leu Thr Val Gln Asp Gln Ile Asp Leu Phe Leu Glu Leu Gln
                245                 250                 255

Lys Arg Gly Ser Ser Glu Ala Gly Phe Leu Ala Phe Leu Ser Leu Thr
            260                 265                 270

Ala Ile Gly Phe Ala Arg Arg Lys Pro Ala Lys Leu Phe Glu Ala Arg
        275                 280                 285

Lys Ile Leu Lys Lys Leu Asn Leu Ser Gly Leu Asp Ser Met Pro Leu
    290                 295                 300

Ile Gly Cys Leu Asp Leu Leu Leu Ala Asp Val Glu Gln Ser Ser Ala
305                 310                 315                 320

Arg Phe Leu Ser Ser Ser Asp Glu Lys Leu Arg Asp Trp Leu Asn Asn
                325                 330                 335

Tyr Pro Gly Glu Lys Leu Glu Ala Ile Cys Ile Phe Cys Lys Asn Trp
            340                 345                 350

Leu Glu Asn Asp Val Leu Val Gly Tyr Arg Asp Ile Asp Leu Lys Glu
        355                 360                 365
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Ile Asp Leu Asp Ser Trp Phe Glu Asp Arg Glu Ile Gln Glu Phe Ile
    370                 375                 380

Glu Gln Ile Glu Lys Lys Ser Asn Arg Thr Val Phe Lys Ser Gly Pro
385                 390                 395                 400

Gln Asn Lys Pro Ile Phe Gln Ala Gln Glu Ser Leu Lys Asp Ser Ser
                405                 410                 415

Thr Gly Pro Asp Leu Asn Ser Asp Asn Phe Glu Glu Gly Arg Leu Pro
            420                 425                 430

Leu Pro Gly Gly Val Arg Glu Asp Gly Gln Glu Val Ile Glu Glu Asn
        435                 440                 445

Ile Tyr Thr Asp Glu Ile Ile Lys Asn Lys Ser Ile Glu Phe Tyr Lys
    450                 455                 460

Tyr Ala Ile Glu Lys Ile Ala Glu Leu Lys Phe Val Phe Gly Glu Ala
465                 470                 475                 480

Leu Glu Asn Tyr Arg Ile Phe Asn Lys Ser Ser Tyr Leu Thr Tyr Leu
                485                 490                 495

Tyr Ala Phe Leu Ile Leu Phe Ala Phe Gly Leu Gly Val Gly Phe Val
            500                 505                 510

Arg Asn Asn Leu Lys Lys Pro Val Gln Glu Lys Glu Ile Ile Asp Asn
        515                 520                 525

Ser Leu Ser Ile Asn Glu Asn Lys Asn Val Phe Tyr Glu Gly Leu Asn
    530                 535                 540

Gln Asp Asp Lys Lys Lys Val Leu Asp Asn Ser Lys Ile Ile Leu Ser
545                 550                 555                 560

Asp Asn Ala Glu Lys Val Ile Phe Ser Gly Glu Glu Ile Lys Thr Ala
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Ser Pro Ser Leu Glu Lys Ile Glu Asn Leu Ile Asn Thr Trp Leu Val
            580                 585                 590
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Asn Lys Ser Lys Phe Leu Ala Gly Lys Gly Glu Ile Asn Leu Ser Lys
        595                 600                 605

Ile Val Gln Asp Asp Leu Ile Asp Arg Leu Lys Lys Glu Arg Glu Leu
    610                 615                 620

Asp Ile Gln Lys Gly Ile Tyr Lys Asn Ile Asn Ala Asn Ile Glu Asn
625                 630                 635                 640

Ile Val Leu Leu Thr Gln Thr Ala Ser Arg Ile Ser Val Ser Val Asp
                645                 650                 655

Leu Lys Tyr Ser Glu Lys Ile Leu Lys Ile Asp Gly Glu Leu Ile Asn
            660                 665                 670

Glu Thr Thr Phe Thr Pro Phe Leu Lys Val Lys Tyr Ile Leu Gly Phe
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Ser Asn Asn Ser Trp Lys Leu Val Asp Tyr Ile Ser Gly Val
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<210> 157
<211> 1986
<212> DNA
<213> Protochlorococcus marinus MT9313

<400> 157

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ccacggcgtc aggcctatga gactgccttg ttggagctca gtcgtgatca tccaggtgag    240

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aacgatttag atgcccttct gccctatcgc attctcgact tattgagtcg ggatcttggt    600

gatcaggttt ctcaccagga aggactgcgc ctacttgaca actttgtgag ccagagagga    660

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cttaacagcc accctggcga tgaattggct gcttttgtg agtactgccg ctcttggctg 1080

cgaggggacg tgcttcccgg ttatagggat gtggatgctg aggccgttga tctagaggct 1140

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gcagatctgc cacgcccgac gcggccggtg ctgatcggtt cggttgtctt tgcggccctg 1440

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gctgctgatc agcctcaagt cacagcacct cctacagcca cactgcaaga ggaggtcctc 1560

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gcacagctca aaggcctgct tcaggcctgg ctcagcaaca aggcagtcgt gcttgccggt 1680

ggcaagagtg atgcactgcc tgaggtcgca agagatccat tggtgcagcg cgtggcgcaa 1740

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gatcaacgcg ttgatgctgc cggcaaggtt gttgaccaaa cgccccaaaa agatctctcg 1920

gtgacttaca tccttggtcg tgatcccgat cgttggcgcc tgcatgaata catcagcggc 1980

aaataa 1986

<210> 158
<211> 661
<212> PRT
<213> Protochlorococcus marinus MT9313

<400> 158

Val Asp Leu Pro Ile Asp His Phe Arg Leu Leu Gly Val Ser Pro Ser
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Ala Asp Ser Glu Ala Ile Leu Arg Ala Leu Glu Leu Arg Leu Asp Arg
20 25 30

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Cys Pro Asp Gln Gly Phe Thr His Glu Val Leu Ile Gln Arg Ala Glu
        35                  40                  45

Leu Leu Arg Leu Ser Ala Asp Leu Leu Thr Asp Pro Pro Arg Arg Gln
    50                  55                  60

Ala Tyr Glu Thr Ala Leu Leu Glu Leu Ser Arg Asp His Pro Gly Glu
65                  70                  75                  80

Thr Ala Gly Leu Asp Val Ser Pro Ser Arg Glu Val Ala Gly Leu Ile
                85                  90                  95

Leu Leu Phe Glu Ala Asn Ser Ser His Glu Val Phe His Leu Ala Ser
            100                 105                 110

Gln Gly Leu Gln Pro Pro Gln Ser Pro Thr Leu Gly Ser Glu Arg Glu
        115                 120                 125

Ala Asp Leu Ala Leu Leu Leu Ala Leu Ala Cys Arg Ala Ala Ala Ala
    130                 135                 140

Glu Glu Gln Glu Gln Arg Arg Tyr Glu Ala Ala Ala Ser Leu Leu His
145                 150                 155                 160

Asp Gly Ile Gln Leu Leu Gln Arg Met Gly Lys Leu Ser Glu Glu Cys
                165                 170                 175

His Lys Leu Glu Asn Asp Leu Asp Ala Leu Leu Pro Tyr Arg Ile Leu
            180                 185                 190

Asp Leu Leu Ser Arg Asp Leu Gly Asp Gln Val Ser His Gln Glu Gly
        195                 200                 205

Leu Arg Leu Leu Asp Asn Phe Val Ser Gln Arg Gly Gly Leu Glu Gly
    210                 215                 220

Thr Ala Pro Ser Pro Ala Pro Gly Gly Leu Asp Gln Ser Glu Phe Asp
225                 230                 235                 240

Asn Phe Phe Lys Gln Ile Arg Lys Phe Leu Thr Val Gln Glu Gln Val
                245                 250                 255
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Asp Leu Phe Leu Arg Trp Gln Gln Ala Gly Ser Ala Asp Ala Gly Phe
260 265 270

Leu Gly Gly Leu Ala Leu Ala Ala Val Gly Phe Ser Arg Arg Lys Pro
275 280 285

Glu Arg Val Gln Glu Ala Arg Gln His Leu Glu Arg Leu Gln Leu Asp
290 295 300

Gly Cys Asp Pro Leu Pro Met Leu Gly Cys Leu Asp Leu Leu Leu Gly
305 310 315 320

Asp Val Gly Arg Ala Gln Glu Arg Phe Leu Arg Ser Thr Asp Pro Arg
325 330 335

Val Lys Asp Cys Leu Asn Ser His Pro Gly Asp Glu Leu Ala Ala Phe
340 345 350

Cys Glu Tyr Cys Arg Ser Trp Leu Arg Gly Asp Val Leu Pro Gly Tyr
355 360 365

Arg Asp Val Asp Ala Glu Ala Val Asp Leu Glu Ala Trp Phe Ala Asp
370 375 380

Arg Asp Val Gln Ala Tyr Val Glu Arg Leu Glu Arg Ser Glu Asn Arg
385 390 395 400

Ala Ser Ser Leu Gly Lys Ala Phe Ser Gly Ser Ser Val Lys Gln Pro
405 410 415

Phe Pro Trp Ala Pro Leu Asp Pro Asp Gly Ile Leu Pro Leu Ser Leu
420 425 430

Gly Gly Pro Asp Val Gly Gln Pro Ala Ala Asp Gln Ser Ser Asp Glu
435 440 445

Phe Ala Ser Asp Gly Met Ala Trp Ile Asp Arg Leu Ala Asp Leu Pro
450 455 460

Arg Pro Thr Arg Pro Val Leu Ile Gly Ser Val Val Phe Ala Ala Leu
465 470 475 480

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Ile Ala Ala Phe Ala Gly Phe Ser Leu Phe Gly Gln Arg Pro Arg Thr
                485                 490                 495

Ser Val Ser Thr Ala Ala Asp Gln Pro Gln Val Thr Ala Pro Pro Thr
            500                 505                 510

Ala Thr Leu Gln Glu Glu Val Leu Met Pro Gln Val Pro Val Ser Ala
        515                 520                 525

Val Val Glu Pro Leu Thr Leu Glu Gln Pro Asn Glu Ala Gln Leu Lys
    530                 535                 540

Gly Leu Leu Gln Ala Trp Leu Ser Asn Lys Ala Val Val Leu Ala Gly
545                 550                 555                 560

Gly Lys Ser Asp Ala Leu Pro Glu Val Ala Arg Asp Pro Leu Val Gln
                565                 570                 575

Arg Val Ala Gln Glu Arg Ala Arg Asp Ala Ala Leu Ala Gln Thr Gln
            580                 585                 590

Lys Val Val Ala Ser Ile Ser Ser Val Glu Val Val Ser Arg Thr Pro
        595                 600                 605

Gln Arg Ile Glu Leu Asn Ala Val Val Thr Tyr Arg Asp Gln Arg Val
    610                 615                 620

Asp Ala Ala Gly Lys Val Val Asp Gln Thr Pro Gln Lys Asp Leu Ser
625                 630                 635                 640

Val Thr Tyr Ile Leu Gly Arg Asp Pro Asp Arg Trp Arg Leu His Glu
                645                 650                 655

Tyr Ile Ser Gly Lys
            660
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<210> 159
<211> 2151
<212> DNA
<213> Synechococcus PCC7002

<400> 159
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caaattaccc aagcctatcg cgatcgcctc tcccaatttc cccgtcgcga acataatgcc 120

ttggccattg aggcccgcaa ccggattatc gagcaagcct ttgaggtgtt atcccaaaca 180

gaaacccgcg ccgtctacga ccatgagctg tcgggcaata tgtttcgttc cctcgtcccc 240

agccgtccga aactgccttt tcccgatcgc ccctccagtg acacagagtt agaagccctg 300

acagcccacc aaccaaccat tgacatcgcg gaaaaagatt tactgggggg actgctgtta 360

ctcctcgacc tgggggagta cgaattagtg ctgaagtggg ctgcccccta cctcaagggc 420

aaaggcaagc tggtcaagga agggaaattt ggggccgtcg aaatcgtcga gcaagaacta 480

cggctttgtt tggccctggc ccactgggaa ttgagccggg aacagtggct ccaacaacat 540

tatgaacagg cggctctctc cggtcagaag agtcaagagc tattggtaga tgtggcacaa 600

tttgcagacc tccaacagga aattcaaggg gatctcaatc gcctcagacc ctatcaagtt 660

ctagaacttc tggccctacc cgaatcagaa acccaagagc gacaacgggg cttacaactg 720

ctccaggaaa tgttgagtgc tcgcgtgggg attgatggcc agggggacga tcagtcgggt 780

ctaagtattg atgatttttt gcgctttatc cagcagttac gcagttatct aacggtgcaa 840

gaacagttgg atctctttgt ggcagaatca aagcgacctt cggcggcagc ggcctaccta 900

gcggtgtatg ctctcttggc tgctgggttt tcgcaacgga aacctgacct ggtcgtgcaa 960

gcccagaccc tattaaaacg cctcggcaaa cgccaggatg ttttcttgga gcaatcaatc 1020

tgcgccttac ttttaggtca gccgtcggaa gccaatcaac tgttagaaca aagtcaggaa 1080

caggaggcga tcgcctacat tcaagagcag tctgaggggg caccggatct actcccaggc 1140

ctatgtctct acggggaaca gtggctgaag acagaggttt tttcccattt ccgcgatctc 1200

cggcaacggc ttgaagatgg ctctgtttcg ttgacggctt acttcgccga tcctgaagtg 1260

cagcaatatc ttgacgatct cctcacggag gctgtcccca cacccacacc acatccagac 1320

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gtttcgccgc atcccagtcg tcccgccaag gttgattcct ttgaggatct cgtcactcaa 1440

actcccgcta cagttccccc ggcaccgcct tctcctggtg tagcacctgt aactgcggca 1500

ttaaacccag acccggaagc gtcttctgct tcgtcaaaat cagtttcgtc aaaaaagtct 1560

atcgggcctt ggggggcgat cgccgctatc gtggggagtg ttttgctggt cgtgggcctg 1620

gtgcgaattt tgtctggcct aactacccag gaacccttac aggtcaccct caacggtgag 1680

ccacccctaa cgatccccag cttagacacc gccgaggcaa ataataatcc ggagaatgga 1740

gcgaccgata caacgacaac gcctgcgctc aatgaggcga tcgccgctga ggtgattcaa 1800

acttggtttg agagtaaagc tagagccttt ggccaagacc gtgatttggc ggctctagaa 1860

aatattttgg cagaaccgtc cctgtcccgc tggcgcagta gtgcccaggc cgtccgcagc 1920

gctggtacct accgcaccta tgaccacagt ttgaccattg aaacggtgag cttcaaccca 1980

gaccaaccca atgtggcgac cgttgaggcc caggtgcagg aaaaggcaga ttattaccgg 2040

gcgaatgggg aacgcgatcc cggccagtcc tatgattctg acctgcgtgt ccgctacagc 2100

ttggtgcgcc aaggcgatcg ctggttgatt cgttcttccc aaaccctgta a 2151

<210> 160
<211> 716
<212> PRT
<213> Synechococcus PCC7002

<400> 160

Met Arg Ile Pro Leu Asp Tyr Tyr Arg Ile Leu Cys Val Pro Ala Lys
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Ala Thr Thr Ala Gln Ile Thr Gln Ala Tyr Arg Asp Arg Leu Ser Gln
20 25 30

Phe Pro Arg Arg Glu His Asn Ala Leu Ala Ile Glu Ala Arg Asn Arg
35 40 45

Ile Ile Glu Gln Ala Phe Glu Val Leu Ser Gln Thr Glu Thr Arg Ala
50 55 60

Val Tyr Asp His Glu Leu Ser Gly Asn Met Phe Arg Ser Leu Val Pro
65 70 75 80

Ser Arg Pro Lys Leu Pro Phe Pro Asp Arg Pro Ser Ser Asp Thr Glu
85 90 95

Leu Glu Ala Leu Thr Ala His Gln Pro Thr Ile Asp Ile Ala Glu Lys
100 105 110

Asp Leu Leu Gly Gly Leu Leu Leu Leu Leu Asp Leu Gly Glu Tyr Glu
115 120 125

Leu Val Leu Lys Trp Ala Ala Pro Tyr Leu Lys Gly Lys Gly Lys Leu
130 135 140

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Val Lys Glu Gly Lys Phe Gly Ala Val Glu Ile Val Glu Gln Glu Leu
145                 150                 155                 160

Arg Leu Cys Leu Ala Leu Ala His Trp Glu Leu Ser Arg Glu Gln Trp
                165                 170                 175

Leu Gln Gln His Tyr Glu Gln Ala Ala Leu Ser Gly Gln Lys Ser Gln
            180                 185                 190

Glu Leu Leu Val Asp Val Ala Gln Phe Ala Asp Leu Gln Gln Glu Ile
        195                 200                 205

Gln Gly Asp Leu Asn Arg Leu Arg Pro Tyr Gln Val Leu Glu Leu Leu
    210                 215                 220

Ala Leu Pro Glu Ser Glu Thr Gln Glu Arg Gln Arg Gly Leu Gln Leu
225                 230                 235                 240

Leu Gln Glu Met Leu Ser Ala Arg Val Gly Ile Asp Gly Gln Gly Asp
                245                 250                 255

Asp Gln Ser Gly Leu Ser Ile Asp Asp Phe Leu Arg Phe Ile Gln Gln
            260                 265                 270

Leu Arg Ser Tyr Leu Thr Val Gln Glu Gln Leu Asp Leu Phe Val Ala
        275                 280                 285

Glu Ser Lys Arg Pro Ser Ala Ala Ala Ala Tyr Leu Ala Val Tyr Ala
    290                 295                 300

Leu Leu Ala Ala Gly Phe Ser Gln Arg Lys Pro Asp Leu Val Val Gln
305                 310                 315                 320

Ala Gln Thr Leu Leu Lys Arg Leu Gly Lys Arg Gln Asp Val Phe Leu
                325                 330                 335

Glu Gln Ser Ile Cys Ala Leu Leu Leu Gly Gln Pro Ser Glu Ala Asn
            340                 345                 350

Gln Leu Leu Glu Gln Ser Gln Glu Gln Glu Ala Ile Ala Tyr Ile Gln
        355                 360                 365
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Glu Gln Ser Glu Gly Ala Pro Asp Leu Leu Pro Gly Leu Cys Leu Tyr
    370                 375                 380

Gly Glu Gln Trp Leu Lys Thr Glu Val Phe Ser His Phe Arg Asp Leu
385                 390                 395                 400

Arg Gln Arg Leu Glu Asp Gly Ser Val Ser Leu Thr Ala Tyr Phe Ala
                405                 410                 415

Asp Pro Glu Val Gln Gln Tyr Leu Asp Asp Leu Leu Thr Glu Ala Val
            420                 425                 430

Pro Thr Pro Thr Pro His Pro Asp Thr Glu Ser Thr Ala Ala Pro Ser
        435                 440                 445

Glu Lys Pro Pro Glu Thr Leu Gln Ser Glu Thr Gly Val Ser Pro His
    450                 455                 460

Pro Ser Arg Pro Ala Lys Val Asp Ser Phe Glu Asp Leu Val Thr Gln
465                 470                 475                 480

Thr Pro Ala Thr Val Pro Pro Ala Pro Pro Ser Pro Gly Val Ala Pro
                485                 490                 495

Val Thr Ala Ala Leu Asn Pro Asp Pro Glu Ala Ser Ser Ala Ser Ser
            500                 505                 510

Lys Ser Val Ser Ser Lys Lys Ser Ile Gly Pro Trp Gly Ala Ile Ala
        515                 520                 525

Ala Ile Val Gly Ser Val Leu Leu Val Val Gly Leu Val Arg Ile Leu
    530                 535                 540

Ser Gly Leu Thr Thr Gln Glu Pro Leu Gln Val Thr Leu Asn Gly Glu
545                 550                 555                 560

Pro Pro Leu Thr Ile Pro Ser Leu Asp Thr Ala Glu Ala Asn Asn Asn
                565                 570                 575

Pro Glu Asn Gly Ala Thr Asp Thr Thr Thr Thr Pro Ala Leu Asn Glu
            580                 585                 590
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Ala Ile Ala Ala Glu Val Ile Gln Thr Trp Phe Glu Ser Lys Ala Arg
        595                 600                 605

Ala Phe Gly Gln Asp Arg Asp Leu Ala Ala Leu Glu Asn Ile Leu Ala
    610                 615                 620

Glu Pro Ser Leu Ser Arg Trp Arg Ser Ser Ala Gln Ala Val Arg Ser
625                 630                 635                 640

Ala Gly Thr Tyr Arg Thr Tyr Asp His Ser Leu Thr Ile Glu Thr Val
                645                 650                 655

Ser Phe Asn Pro Asp Gln Pro Asn Val Ala Thr Val Glu Ala Gln Val
            660                 665                 670

Gln Glu Lys Ala Asp Tyr Tyr Arg Ala Asn Gly Glu Arg Asp Pro Gly
        675                 680                 685

Gln Ser Tyr Asp Ser Asp Leu Arg Val Arg Tyr Ser Leu Val Arg Gln
    690                 695                 700

Gly Asp Arg Trp Leu Ile Arg Ser Ser Gln Thr Leu
705                 710                 715
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<210> 161
<211> 2469
<212> DNA
<213> Synechococcus PCC7942

<400> 161

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gcgagtaacc gatcgctggg ataagagttg gtgcttctgg ctctcaagaa tagggttttc    180

cgtcgcgtat tcccgatcac atccccctgt gtctgctacg gagataacgc cgatcactca    240

acagaattgg taagttgacg gtcaagttgg gatgatgaag tcggctcaag ctggcgatcc    300

ggatctggtg ggtgttctgt gcgtattcct ctcgattact accgaattct ctgtgttggc    360

gtgcaagcct cggcagacaa acttgccgaa agctaccgcg atcgcctcaa ccaatcgccc    420

tcccatgagt tttcagagct ggcattgcag gcgcggcggc aactcctcga agcagcgatt    480

gctgagctga gtgatcccga acagcgcgat cgctacgatc gccgcttttt tcagggcggt    540

ctggaagcga ttgaaccaag cctagaactc gaagactggc agcgaattgg agccctgctg    600
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atcctgctgg aattggggga atacgatcgc gtttcgcaac tggctgagga actcctgcca 660

gactacgacg cgagcgcaga agtacgcgat cagttcgcgc ggggtgatat cgccttggcg 720

atcgcactat cccagcaatc cctcggtcga gaatgccgtc agcagggtct gtacgaacag 780

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gataactttt tgatgtttct ccagcaaatt cgcggctatc tgaccctggc tgaacagcag 1080

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tatcgaggcg accagctgct cgaaacgcgc cgagatttgg gcttggtgat ccgctaccag 2160

ctcgtgcgcg agaacaacat ctggaaaatt gcttcgatta gtttggtgcg ctaggaattc 2220

gcaaggggtg aacccccctgc ggtcttttct gtagatcccc tagagcgatc gcagaatgtt 2280

cagcgattcc tggatgtgcg cttgggcatt caagagtgaa tcaaaaatgt ggcgcacctt 2340

gccctctttg tcgatcacat aagtgacgcg acccggaatc acaaacaggg ttttgggcac 2400

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tttctgggc 2469

<210> 162
<211> 631
<212> PRT
<213> Synechococcus PCC7942

<400> 162

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Ala Ser Ala Asp Lys Leu Ala Glu Ser Tyr Arg Asp Arg Leu Asn Gln
20 25 30

Ser Pro Ser His Glu Phe Ser Glu Leu Ala Leu Gln Ala Arg Arg Gln
35 40 45

Leu Leu Glu Ala Ala Ile Ala Glu Leu Ser Asp Pro Glu Gln Arg Asp
50 55 60

Arg Tyr Asp Arg Arg Phe Phe Gln Gly Gly Leu Glu Ala Ile Glu Pro
65 70 75 80

Ser Leu Glu Leu Glu Asp Trp Gln Arg Ile Gly Ala Leu Leu Ile Leu
85 90 95

Leu Glu Leu Gly Glu Tyr Asp Arg Val Ser Gln Leu Ala Glu Glu Leu
100 105 110

Leu Pro Asp Tyr Asp Ala Ser Ala Glu Val Arg Asp Gln Phe Ala Arg
115 120 125

Gly Asp Ile Ala Leu Ala Ile Ala Leu Ser Gln Gln Ser Leu Gly Arg
130 135 140

Glu Cys Arg Gln Gln Gly Leu Tyr Glu Gln Ala Ala Gln His Phe Gly
145 150 155 160

Arg Ser Gln Ser Ala Leu Ala Asp His Gln Arg Phe Pro Glu Leu Ser
165 170 175

```
Arg Thr Leu His Gln Glu Gln Gly Gln Leu Arg Pro Tyr Arg Ile Leu
            180                 185                 190

Glu Arg Leu Ala Gln Pro Leu Thr Ala Asp Ser Asp Arg Gln Gln Gly
        195                 200                 205

Leu Leu Leu Leu Gln Ala Met Leu Asp Asp Arg Gln Gly Ile Glu Gly
    210                 215                 220

Pro Gly Asp Asp Gly Ser Gly Leu Thr Leu Asp Asn Phe Leu Met Phe
225                 230                 235                 240

Leu Gln Gln Ile Arg Gly Tyr Leu Thr Leu Ala Glu Gln Gln Leu Leu
                245                 250                 255

Phe Glu Ser Glu Ala Arg Arg Pro Ser Pro Ala Ala Ser Phe Phe Ala
            260                 265                 270

Cys Tyr Thr Leu Ile Ala Arg Gly Phe Cys Asp His Gln Pro Ser Leu
        275                 280                 285

Ile His Arg Ala Ser Leu Leu Leu His Glu Leu Lys Ser Arg Met Asp
    290                 295                 300

Val His Ile Glu Gln Ala Ile Ala Ser Leu Leu Leu Gly Gln Pro Glu
305                 310                 315                 320

Glu Ala Glu Ala Leu Leu Val Gln Ser Gln Asp Glu Glu Thr Leu Ser
                325                 330                 335

Gln Ile Arg Ala Leu Ala Gln Gly Glu Ala Leu Ile Val Gly Leu Cys
            340                 345                 350

Arg Phe Thr Glu Thr Trp Leu Ala Thr Lys Val Phe Pro Asp Phe Arg
        355                 360                 365

Asp Leu Lys Glu Arg Thr Ala Pro Leu Gln Pro Tyr Phe Asp Asp Pro
    370                 375                 380

Asp Val Gln Thr Tyr Leu Asp Ala Ile Val Glu Leu Pro Ser Asp Leu
385                 390                 395                 400

Met Pro Thr Pro Leu Pro Val Glu Pro Leu Glu Val Arg Ser Ser Leu
                405                 410                 415
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Leu Ala Lys Glu Leu Pro Thr Pro Ala Thr Pro Gly Val Ala Pro Pro
            420                 425                 430

Pro Arg Arg Arg Arg Arg Asp Arg Ser Glu Arg Pro Ala Arg Thr Ala
        435                 440                 445

Lys Arg Leu Pro Leu Pro Trp Ile Gly Leu Gly Val Val Val Val Leu
    450                 455                 460

Gly Gly Gly Thr Gly Val Trp Ala Trp Arg Ser Arg Ser Asn Ser Thr
465                 470                 475                 480

Pro Pro Thr Pro Pro Pro Val Val Gln Thr Leu Pro Glu Ala Val Pro
                485                 490                 495

Ala Pro Ser Pro Ala Pro Val Thr Val Ala Leu Asp Arg Ala Gln Ala
            500                 505                 510

Glu Thr Val Leu Gln Asn Trp Leu Ala Ala Lys Ala Ala Ala Leu Gly
        515                 520                 525

Pro Gln Tyr Asp Arg Asp Arg Leu Ala Thr Val Leu Thr Gly Glu Val
    530                 535                 540

Leu Gln Thr Trp Gln Gly Phe Ser Ser Gln Gln Ala Asn Thr Gln Leu
545                 550                 555                 560

Thr Ser Gln Phe Asp His Lys Leu Thr Val Asp Ser Val Gln Leu Ser
                565                 570                 575

Asp Gly Asp Gln Arg Ala Val Val Gln Ala Lys Val Asp Glu Val Glu
            580                 585                 590

Gln Val Tyr Arg Gly Asp Gln Leu Leu Glu Thr Arg Arg Asp Leu Gly
        595                 600                 605

Leu Val Ile Arg Tyr Gln Leu Val Arg Glu Asn Asn Ile Trp Lys Ile
    610                 615                 620

Ala Ser Ile Ser Leu Val Arg
625                 630
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<210> 163
<211> 2400
<212> DNA
<213> Anabaena PCC7120

<400> 163
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tatcttgctc acgcctacga cccagacaac gcggctacaa ccaaagtggc agtggaaaat 300

cgtggggaca gcaacaatgg tcatttcgat gtccaaagcc tgagcatcga agtttcctcc 360

gaggaattaa ttggtgcttt attaattttg caagagttgg gagagtatga actcgtactc 420

aagttaggtc gtaattactt aggtaatcaa aacggcacag catccaccag aaatggcaat 480

catcgcacgc ctgaagaatt tctcgatagt tctgaacgtc cagatattct cttgactgtt 540

gctttggcct cattagaatt agggcgggaa caatggcaac aaggccacta tgaaaacgct 600

gctttgtctt tagagactgg gcaagaagtg ctgtttagtg aaggcatctt ccccagcgtc 660

caggcagaaa ttcaggctga tctttacaaa ttacgccctt atagaatttt agaattactt 720

gccttacccc aggaaaaaac cattgaacgc caccaagggc tggatctatt acaaagcatc 780

ttagacgatc gcggtggcat tgatggtaca ggcaatgatc aatcaggctt aaacattgat 840

gacttcctcc gattcatcca gcaattacgc caccacttaa cagtggctga acaacataag 900

ttgtttgatg gtgaaagcaa acgcccttcg gctgtggcta catacttagc tgtttatgct 960

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ctagggcaaa ctgaagaagc cacgcgagtt ttagaactga gccaagaata cgaagcttta 1140

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gccgaacaat ggctgcaaaa tgaagttttc ccccatttcc gcgatttgtc cagacagcaa 1260

gcttccctga aagattactt tgctaatcaa caagtacaag cgtatttaga agccttgccc 1320

aacgacgcgg aaaccactaa tgaatgggct gtaattaacc gccaatcgtt ttctcaaccc 1380

aggggcaatt cttactctgg aggaacgcca gtcgccaaac gtcccgtagg gaaggcgaac 1440

aggccaggag aagcgtccac aagaccagtt ccccaacgta gtcatccatc agaagtaaat 1500

cggcagtttc atcaaaacag aacccctgat cccgaattac cagaaacatc aaaccacaga 1560

agaccagagt cttcaaattt tacaactgct agagaaaata tatcgaccac agatgcttac 1620

actgacaatt atccaccaga gatccctgta gaacgcgcca gcagacctgt tcagccgggg 1680

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aagccacagg cagttgtcaa cagaggacac agtattcatc agcaacgcca accctcacct 1800

agcactctag gccggaaaac aagattactt tggatagttt tgggttcttt gggtgggata 1860

ttattgttct ggctgatagt ctcaacgact tttgggtggt taaagaatgt attcttccca 1920

gcaccatctt tacaaggtga gcaattatcg attcagatta gtcaaccacc tttagagatt 1980

cctgacaaaa atgcccagat acaatcccca gaggtgagtc tcacagaaga aacggcaagg 2040

aaaataattg aaaattggtt ggctaccaaa gctagtgctt taggcgctga acataaaatt 2100

gagagtttaa acgagatttt aactggttca gcgttatctc aatggcggct aattgccttg 2160

caagataaag cagacaatcg tcatcgagaa tacagtcata gtgtcaaggt agactccatc 2220

agtaaatctg acatagatcc caatcgtgca agtgtggggg ctacagtcag agagttaacc 2280

caattttatg agaatgggca aaaagggaag tcttctgacg aaagattacg tgtacgctat 2340

gaattgattc gacaagatga tatttggcgg attcagagga tgtcagccgc tataaattaa 2400

<210> 164
<211> 798
<212> PRT
<213> Anabaena PCC7120

<400> 164

Met Leu Ile Thr Val Gln Gly Lys Tyr Ala Val Arg Ile Pro Leu Asp
1 5 10 15

Tyr Tyr Arg Ile Leu Gly Leu Pro Leu Ala Ala Ser Asp Glu Gln Leu
20 25 30

Arg Gln Ala Tyr Ser Asp Arg Ile Val Gln Leu Pro Arg Arg Glu Tyr
35 40 45

Ser Gln Ala Ala Ile Ala Ser Arg Lys Gln Leu Ile Glu Glu Ala Tyr
50 55 60

Val Val Leu Ser Asp Pro Lys Glu Arg Ser Ser Tyr Asp Gln Leu Tyr
65 70 75 80

Leu Ala His Ala Tyr Asp Pro Asp Asn Ala Ala Thr Thr Lys Val Ala
85 90 95

```
Val Glu Asn Arg Gly Asp Ser Asn Asn Gly His Phe Asp Val Gln Ser
            100                 105                 110

Leu Ser Ile Glu Val Ser Ser Glu Glu Leu Ile Gly Ala Leu Leu Ile
        115                 120                 125

Leu Gln Glu Leu Gly Glu Tyr Glu Leu Val Leu Lys Leu Gly Arg Asn
    130                 135                 140

Tyr Leu Gly Asn Gln Asn Gly Thr Ala Ser Thr Arg Asn Gly Asn His
145                 150                 155                 160

Arg Thr Pro Glu Glu Phe Leu Asp Ser Ser Glu Arg Pro Asp Ile Leu
                165                 170                 175

Leu Thr Val Ala Leu Ala Ser Leu Glu Leu Gly Arg Glu Gln Trp Gln
            180                 185                 190

Gln Gly His Tyr Glu Asn Ala Ala Leu Ser Leu Glu Thr Gly Gln Glu
        195                 200                 205

Val Leu Phe Ser Glu Gly Ile Phe Pro Ser Val Gln Ala Glu Ile Gln
    210                 215                 220

Ala Asp Leu Tyr Lys Leu Arg Pro Tyr Arg Ile Leu Glu Leu Leu Ala
225                 230                 235                 240

Leu Pro Gln Glu Lys Thr Ile Glu Arg His Gln Gly Leu Asp Leu Leu
                245                 250                 255

Gln Ser Ile Leu Asp Asp Arg Gly Gly Ile Asp Gly Thr Gly Asn Asp
            260                 265                 270

Gln Ser Gly Leu Asn Ile Asp Asp Phe Leu Arg Phe Ile Gln Gln Leu
        275                 280                 285

Arg His His Leu Thr Val Ala Glu Gln His Lys Leu Phe Asp Gly Glu
    290                 295                 300
```

Ser Lys Arg Pro Ser Ala Val Ala Thr Tyr Leu Ala Val Tyr Ala Ser
305 310 315 320

Ile Ala Arg Gly Phe Thr Gln Arg Gln Pro Ala Leu Ile Arg His Ala
325 330 335

Lys Gln Ile Leu Met Arg Leu Ser Lys Arg Gln Asp Val His Leu Glu
340 345 350

Gln Ser Leu Cys Ala Leu Leu Leu Gly Gln Thr Glu Glu Ala Thr Arg
355 360 365

Val Leu Glu Leu Ser Gln Glu Tyr Glu Ala Leu Ala Leu Ile Arg Glu
370 375 380

Lys Ser Gln Asp Ser Pro Asp Leu Leu Pro Gly Leu Cys Leu Tyr Ala
385 390 395 400

Glu Gln Trp Leu Gln Asn Glu Val Phe Pro His Phe Arg Asp Leu Ser
405 410 415

Arg Gln Gln Ala Ser Leu Lys Asp Tyr Phe Ala Asn Gln Gln Val Gln
420 425 430

Ala Tyr Leu Glu Ala Leu Pro Asn Asp Ala Glu Thr Thr Asn Glu Trp
435 440 445

Ala Val Ile Asn Arg Gln Ser Phe Ser Gln Pro Arg Gly Asn Ser Tyr
450 455 460

Ser Gly Gly Thr Pro Val Ala Lys Arg Pro Val Gly Lys Ala Asn Arg
465 470 475 480

Pro Gly Glu Ala Ser Thr Arg Pro Val Pro Gln Arg Ser His Pro Ser
485 490 495

Glu Val Asn Arg Gln Phe His Gln Asn Arg Thr Pro Asp Pro Glu Leu
500 505 510

Pro Glu Thr Ser Asn His Arg Arg Pro Glu Ser Ser Asn Phe Thr Thr
515 520 525

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Ala Arg Glu Asn Ile Ser Thr Thr Asp Ala Tyr Thr Asp Asn Tyr Pro
    530                 535                 540

Pro Glu Ile Pro Val Glu Arg Ala Ser Arg Pro Val Gln Pro Gly Val
545                 550                 555                 560

Ser Gly Tyr Thr Gln Ser Thr Pro Pro Arg Gln Thr Pro Lys Arg Arg
                565                 570                 575

Arg Arg Lys Lys Pro Gln Ala Val Val Asn Arg Gly His Ser Ile His
            580                 585                 590

Gln Gln Arg Gln Pro Ser Pro Ser Thr Leu Gly Arg Lys Thr Arg Leu
        595                 600                 605

Leu Trp Ile Val Leu Gly Ser Leu Gly Gly Ile Leu Leu Phe Trp Leu
    610                 615                 620

Ile Val Ser Thr Thr Phe Gly Trp Leu Lys Asn Val Phe Phe Pro Ala
625                 630                 635                 640

Pro Ser Leu Gln Gly Glu Gln Leu Ser Ile Gln Ile Ser Gln Pro Pro
                645                 650                 655

Leu Glu Ile Pro Asp Lys Asn Ala Gln Ile Gln Ser Pro Glu Val Ser
            660                 665                 670

Leu Thr Glu Glu Thr Ala Arg Lys Ile Ile Glu Asn Trp Leu Ala Thr
        675                 680                 685

Lys Ala Ser Ala Leu Gly Ala Glu His Lys Ile Glu Ser Leu Asn Glu
    690                 695                 700

Ile Leu Thr Gly Ser Ala Leu Ser Gln Trp Arg Leu Ile Ala Leu Gln
705                 710                 715                 720

Asp Lys Ala Asp Asn Arg His Arg Glu Tyr Ser His Ser Val Lys Val
                725                 730                 735

Asp Ser Ile Ser Lys Ser Asp Ile Asp Pro Asn Arg Ala Ser Val Gly
            740                 745                 750
```

```
Ala Thr Val Arg Glu Leu Thr Gln Phe Tyr Glu Asn Gly Gln Lys Gly
        755                 760                 765

Lys Ser Ser Asp Glu Arg Leu Arg Val Arg Tyr Glu Leu Ile Arg Gln
    770                 775                 780

Asp Asp Ile Trp Arg Ile Gln Arg Met Ser Ala Ala Ile Asn
785                 790                 795
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<210> 165
<211> 798
<212> PRT
<213> Anabaena PCC7120

<400> 165

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Tyr Tyr Arg Ile Leu Gly Leu Pro Leu Ala Ala Ser Asp Glu Gln Leu
            20                  25                  30

Arg Gln Ala Tyr Ser Asp Arg Ile Val Gln Leu Pro Arg Arg Glu Tyr
        35                  40                  45

Ser Gln Ala Ala Ile Ala Ser Arg Lys Gln Leu Ile Glu Glu Ala Tyr
    50                  55                  60

Val Val Leu Ser Asp Pro Lys Glu Arg Ser Ser Tyr Asp Gln Leu Tyr
65                  70                  75                  80

Leu Ala His Ala Tyr Asp Pro Asp Asn Ala Ala Thr Thr Lys Val Ala
                85                  90                  95

Val Glu Asn Arg Gly Asp Ser Asn Asn Gly His Phe Asp Val Gln Ser
            100                 105                 110

Leu Ser Ile Glu Val Ser Ser Glu Glu Leu Ile Gly Ala Leu Leu Ile
        115                 120                 125

Leu Gln Glu Leu Gly Glu Tyr Glu Leu Val Leu Lys Leu Gly Arg Asn
    130                 135                 140

Tyr Leu Gly Asn Gln Asn Gly Thr Ala Ser Thr Arg Asn Gly Asn His
145                 150                 155                 160
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Arg Thr Pro Glu Glu Phe Leu Asp Ser Ser Glu Arg Pro Asp Ile Leu
165 170 175

Leu Thr Val Ala Leu Ala Ser Leu Glu Leu Gly Arg Glu Gln Trp Gln
180 185 190

Gln Gly His Tyr Glu Asn Ala Ala Leu Ser Leu Glu Thr Gly Gln Glu
195 200 205

Val Leu Phe Ser Glu Gly Ile Phe Pro Ser Val Gln Ala Glu Ile Gln
210 215 220

Ala Asp Leu Tyr Lys Leu Arg Pro Tyr Arg Ile Leu Glu Leu Leu Ala
225 230 235 240

Leu Pro Gln Glu Lys Thr Ile Glu Arg His Gln Gly Leu Asp Leu Leu
245 250 255

Gln Ser Ile Leu Asp Asp Arg Gly Gly Ile Asp Gly Thr Gly Asn Asp
260 265 270

Gln Ser Gly Leu Asn Ile Asp Asp Phe Leu Arg Phe Ile Gln Gln Leu
275 280 285

Arg His His Leu Thr Val Ala Glu Gln His Lys Leu Phe Asp Gly Glu
290 295 300

Ser Lys Arg Pro Ser Ala Val Ala Thr Tyr Leu Ala Val Tyr Ala Ser
305 310 315 320

Ile Ala Arg Gly Phe Thr Gln Arg Gln Pro Ala Leu Ile Arg His Ala
325 330 335

Lys Gln Ile Leu Met Arg Leu Ser Lys Arg Gln Asp Val His Leu Glu
340 345 350

Gln Ser Leu Cys Ala Leu Leu Leu Gly Gln Thr Glu Glu Ala Thr Arg
355 360 365

Val Leu Glu Leu Ser Gln Glu Tyr Glu Ala Leu Ala Leu Ile Arg Glu
370 375 380

```
Lys Ser Gln Asp Ser Pro Asp Leu Leu Pro Gly Leu Cys Leu Tyr Ala
385                 390                 395                 400

Glu Gln Trp Leu Gln Asn Glu Val Phe Pro His Phe Arg Asp Leu Ser
                405                 410                 415

Arg Gln Gln Ala Ser Leu Lys Asp Tyr Phe Ala Asn Gln Gln Val Gln
            420                 425                 430

Ala Tyr Leu Glu Ala Leu Pro Asn Asp Ala Glu Thr Thr Asn Glu Trp
        435                 440                 445

Ala Val Ile Asn Arg Gln Ser Phe Ser Gln Pro Arg Gly Asn Ser Tyr
    450                 455                 460

Ser Gly Gly Thr Pro Val Ala Lys Arg Pro Val Gly Lys Ala Asn Arg
465                 470                 475                 480

Pro Gly Glu Ala Ser Thr Arg Pro Val Pro Gln Arg Ser His Pro Ser
                485                 490                 495

Glu Val Asn Arg Gln Phe His Gln Asn Arg Thr Pro Asp Pro Glu Leu
            500                 505                 510

Pro Glu Thr Ser Asn His Arg Arg Pro Glu Ser Ser Asn Phe Thr Thr
        515                 520                 525

Ala Arg Glu Asn Ile Ser Thr Thr Asp Ala Tyr Thr Asp Asn Tyr Pro
    530                 535                 540

Pro Glu Ile Pro Val Glu Arg Ala Ser Arg Pro Val Gln Pro Gly Val
545                 550                 555                 560

Ser Gly Tyr Thr Gln Ser Thr Pro Pro Arg Gln Thr Pro Lys Arg Arg
                565                 570                 575

Arg Arg Lys Lys Pro Gln Ala Val Val Asn Arg Gly His Ser Ile His
            580                 585                 590

Gln Gln Arg Gln Pro Ser Pro Ser Thr Leu Gly Arg Lys Thr Arg Leu
        595                 600                 605
```

```
Leu Trp Ile Val Leu Gly Ser Leu Gly Gly Ile Leu Leu Phe Trp Leu
    610                 615                 620

Ile Val Ser Thr Thr Phe Gly Trp Leu Lys Asn Val Phe Phe Pro Ala
625                 630                 635                 640

Pro Ser Leu Gln Gly Glu Gln Leu Ser Ile Gln Ile Ser Gln Pro Pro
                645                 650                 655

Leu Glu Ile Pro Asp Lys Asn Ala Gln Ile Gln Ser Pro Glu Val Ser
            660                 665                 670

Leu Thr Glu Glu Thr Ala Arg Lys Ile Ile Glu Asn Trp Leu Ala Thr
        675                 680                 685

Lys Ala Ser Ala Leu Gly Ala Glu His Lys Ile Glu Ser Leu Asn Glu
    690                 695                 700

Ile Leu Thr Gly Ser Ala Leu Ser Gln Trp Arg Leu Ile Ala Leu Gln
705                 710                 715                 720

Asp Lys Ala Asp Asn Arg His Arg Glu Tyr Ser His Ser Val Lys Val
                725                 730                 735

Asp Ser Ile Ser Lys Ser Asp Ile Asp Pro Asn Arg Ala Ser Val Gly
            740                 745                 750

Ala Thr Val Arg Glu Leu Thr Gln Phe Tyr Glu Asn Gly Gln Lys Gly
        755                 760                 765

Lys Ser Ser Asp Glu Arg Leu Arg Val Arg Tyr Glu Leu Ile Arg Gln
    770                 775                 780

Asp Asp Ile Trp Arg Ile Gln Arg Met Ser Ala Ala Ile Asn
785                 790                 795
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<211> 2307
<212> DNA
<213> Nostoc punctiforme

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caattgcgac aggcatacag cgatcgcatt gtacaattgc cacgacgtga gtattctcag 120

gcagcaattt cttctcgtaa acaactcata gaagaagctt acgtggtttt atcagatcca 180

aaacaacgca gtacctacga tcagctttat cttgcccacg cctatgaccc tgataacctt 240

gctgctgccg cagtagcaca ggaaaatcgt acagaaagca ccaaaagggg tagtgatacc 300

cagagtcttg gtatagaaat tacccaagac gaattagttg gcgctttatt aattttgcaa 360

gagttgggtg aatacgaact tgtattgaaa ctaggtcgtc cgtacctagt aaataaaaat 420

agtgctacaa gttcaagaaa aagcaataac ttagcagatg aagaaattta tgaaagtgct 480

gaacacccag atgtcgttct cactgttgct cttgcctgtc tagaattagg tcgggaacag 540

tggcagcaag gtcactacga aaatgccgcc atatccctag aaactggtca agagctgcta 600

gtacgtgaag gtttgttctc cagtatccag gcagaaattc aggctgatct ttacaaattg 660

cggccatatc gaattttgga gttgctcgca ttacctcaag aaaagactgc cgaacgaagc 720

caaggcttag aattattgca aaatctctta gaagatcgtg gcgggattga tggcacgaac 780

aatgatgaat cgggtttaaa catagatgac tttctgcgat ttatccagca gttacgcaac 840

cacttaacag ttgcagaaca gcacaagtta tttgaagctc aaagcaaacg ttcttctgct 900

gttgccactt acttagctgt ttatgccttg atagcgcgag gatttgctca acggcaacct 960

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ttagaacagt cgctatgtgc cttacttttg gggcaaactg aagaagcaac tcgtgtttta 1080

gaacttagtc aggagtacga agctttagct tttattcggg aaaaatctca ggactctcca 1140

gatttgttac cgggtctgtg tttatatgca gaacagtggc tgcaacacga agtctttccc 1200

cattttcgag atttagcaaa ccagcaagct ttcctaaaag attactttgc taaccaacag 1260

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acaaatgcag aggcagaaga agttattcac acttggttat ctaccaaagc cgcagcttta 1980

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acggtcaaag aagtgacgca gttatatgaa aataatcagt ttaaaaactc ttctaacgat 2220

aaattaagag ttcggtatga cttgattcga gaacgaggta aatggcgtat tcagagtaca 2280

tctgttgtaa atcaattcac cagataa 2307

<210> 167
<211> 768
<212> PRT
<213> Nostoc punctiforme

<400> 167

Val Arg Ile Pro Leu Asp Tyr Tyr Arg Ile Leu Gly Leu Pro Leu Ala
1 5 10 15

Ala Ser Glu Glu Gln Leu Arg Gln Ala Tyr Ser Asp Arg Ile Val Gln
20 25 30

Leu Pro Arg Arg Glu Tyr Ser Gln Ala Ala Ile Ser Ser Arg Lys Gln
35 40 45

Leu Ile Glu Glu Ala Tyr Val Val Leu Ser Asp Pro Lys Gln Arg Ser
50 55 60

Thr Tyr Asp Gln Leu Tyr Leu Ala His Ala Tyr Asp Pro Asp Asn Leu
65 70 75 80

Ala Ala Ala Ala Val Ala Gln Glu Asn Arg Thr Glu Ser Thr Lys Arg
85 90 95

Gly Ser Asp Thr Gln Ser Leu Gly Ile Glu Ile Thr Gln Asp Glu Leu
100 105 110

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Val Gly Ala Leu Leu Ile Leu Gln Glu Leu Gly Glu Tyr Glu Leu Val
        115                 120                 125

Leu Lys Leu Gly Arg Pro Tyr Leu Val Asn Lys Asn Ser Ala Thr Ser
    130                 135                 140

Ser Arg Lys Ser Asn Asn Leu Ala Asp Glu Glu Ile Tyr Glu Ser Ala
145                 150                 155                 160

Glu His Pro Asp Val Val Leu Thr Val Ala Leu Ala Cys Leu Glu Leu
                165                 170                 175

Gly Arg Glu Gln Trp Gln Gln Gly His Tyr Glu Asn Ala Ala Ile Ser
            180                 185                 190

Leu Glu Thr Gly Gln Glu Leu Leu Val Arg Glu Gly Leu Phe Ser Ser
        195                 200                 205

Ile Gln Ala Glu Ile Gln Ala Asp Leu Tyr Lys Leu Arg Pro Tyr Arg
    210                 215                 220

Ile Leu Glu Leu Leu Ala Leu Pro Gln Glu Lys Thr Ala Glu Arg Ser
225                 230                 235                 240

Gln Gly Leu Glu Leu Leu Gln Asn Leu Leu Glu Asp Arg Gly Gly Ile
                245                 250                 255

Asp Gly Thr Asn Asn Asp Glu Ser Gly Leu Asn Ile Asp Asp Phe Leu
            260                 265                 270

Arg Phe Ile Gln Gln Leu Arg Asn His Leu Thr Val Ala Glu Gln His
        275                 280                 285

Lys Leu Phe Glu Ala Gln Ser Lys Arg Ser Ser Ala Val Ala Thr Tyr
    290                 295                 300

Leu Ala Val Tyr Ala Leu Ile Ala Arg Gly Phe Ala Gln Arg Gln Pro
305                 310                 315                 320

Ala Leu Ile Arg Gln Ala Arg Gln Met Leu Val Arg Leu Gly Lys Arg
                325                 330                 335

Gln Asp Val His Leu Glu Gln Ser Leu Cys Ala Leu Leu Leu Gly Gln
            340                 345                 350
```

Thr Glu Glu Ala Thr Arg Val Leu Glu Leu Ser Gln Glu Tyr Glu Ala
355 360 365

Leu Ala Phe Ile Arg Glu Lys Ser Gln Asp Ser Pro Asp Leu Leu Pro
370 375 380

Gly Leu Cys Leu Tyr Ala Glu Gln Trp Leu Gln His Glu Val Phe Pro
385 390 395 400

His Phe Arg Asp Leu Ala Asn Gln Gln Ala Phe Leu Lys Asp Tyr Phe
405 410 415

Ala Asn Gln Gln Val Gln Ala Tyr Leu Glu Ala Leu Pro Thr Asp Ala
420 425 430

Gln Thr Thr Asn Glu Trp Ala Val Ile Asn Pro Gln Tyr Phe Pro Gln
435 440 445

Ala Lys Ala Lys Asn Thr His Phe His Asn Asn Ser Thr Lys Thr Ser
450 455 460

Ala Ser Phe Asn His Ser Arg Val Pro Asn Pro Asp Leu Pro Glu Thr
465 470 475 480

Pro Thr Lys Glu Thr Ser Glu Tyr Pro Asn Phe Ser Pro Pro Met Trp
485 490 495

Ser Ser Ser Gly Ser Ile Lys Ser Glu Val Pro Ala Ala Glu Arg Met
500 505 510

Ser Arg Gly Thr Asn Gln His Leu Asn Gly Ser Ala Lys Ser Ala Ala
515 520 525

Ser Gly His Asn Gln Lys Arg Arg Arg Arg Lys Pro Thr Pro Ser Ala
530 535 540

Ser Arg Glu Arg Ile Pro Asp Asn Arg Pro His Ser Arg Arg Pro Arg
545 550 555 560

Arg Arg Arg Thr Phe Ala Asn Thr Ile Glu Gly Lys Thr Arg Leu Val
565 570 575

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Trp Arg Val Phe Ile Ser Leu Val Ser Ile Leu Val Phe Trp Val Leu
            580                 585                 590

Ala Thr Thr Thr Phe Gly Trp Leu Lys Asn Leu Phe Phe Pro Gln Pro
        595                 600                 605

Ser Pro Pro Asp Leu Gln Leu Phe Val Gln Ile Asn Gln Pro Pro Leu
    610                 615                 620

Pro Ile Pro Asp Pro Asn Arg Lys Pro Glu Ser Glu Glu Gly Pro Leu
625                 630                 635                 640

Thr Asn Ala Glu Ala Glu Glu Val Ile His Thr Trp Leu Ser Thr Lys
                645                 650                 655

Ala Ala Ala Leu Gly Pro Asn His Glu Ile Asn Asn Leu Glu Gln Ile
            660                 665                 670

Leu Thr Gly Ser Ala Leu Ser Gln Trp Arg Leu Ile Ala Gln Gln Asn
        675                 680                 685

Lys Leu Asp Asn Arg Tyr Arg Lys Phe Asp His Ser Leu Lys Ile Glu
    690                 695                 700

Ser Val Glu Lys Ile Gly Leu Phe Ala Asp Arg Ala Ala Val Glu Ala
705                 710                 715                 720

Thr Val Lys Glu Val Thr Gln Leu Tyr Glu Asn Asn Gln Phe Lys Asn
                725                 730                 735

Ser Ser Asn Asp Lys Leu Arg Val Arg Tyr Asp Leu Ile Arg Glu Arg
            740                 745                 750

Gly Lys Trp Arg Ile Gln Ser Thr Ser Val Val Asn Gln Phe Thr Arg
        755                 760                 765
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<211> 2145
<212> DNA
<213> Synechocystis PCC6803

<400> 168
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gccgcagtta ctctccgcaa tcaattactg gcgatcgcct atgaaaccct gagggatccg 180

gaaaaacgtc aggcatacga ccaagaatgg tggggagcca tggatgaagc cctgggggag 240

gccttacccc tcactacccc ggagttggaa tgtagcccag agcaagaaat tggagccctg 300

ttgatcctgt tggatttggg ggaatacgaa ctcgtggtta agtatggtga gccagtactc 360

cacgatccca accctccggc gggaggcctg ccccaggact atttgctttc ggtaattttg 420

gcccactggg aactgagccg ggaacgttgg caacaacagc agtatgaatt tgccgccacc 480

gccagtctta aggccctagc tcggttgcaa caggataatg acttccccgc cttggaagca 540

gaaattcgtc aggaactata ccgtctgcga ccctaccgta tcctcgaact tttggctaag 600

gaggggcaag gggaggagca acgtcagcag ggtctagctc tgttgcaagc gatggtgcag 660

gaccggggcg gcattgaagg taaggggaa gattattccg gattgggaaa tgatgacttt 720

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ttgcccgaaa gtcaacggcc atctttagta gcaagctatt tggcagtaca tagtctgatg 840

gctgagggag tgaaggaaca ggaccccatg gccattgtcg aagcaaaatc tttgattata 900

cagttggaaa attgtcaaga tttggcccta gaaaaggtaa tttgtgaatt attattgggt 960

caaacggaag ttgttctggc ggcgatcgac cagggagatc cgaaaatagt agctggcctc 1020

gaatctaagt tagcgacggg ggaagacccc ttaactgctt tttatacttt cactgagcag 1080

tggctagagg aagaaattgt cccctacttt agggatcttt ctccggagac cctttccccc 1140

aaggcctatt tcaataatcc ctccgttcag cagtatctag aacaactaga gccggattcc 1200

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actcccatgg tacatagttc cgccgccctt cccgatcgcc ctttgacctc caccgttccc 1320

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ctggaccaac cttcagaatt tatccccgat gaagccacga gccggaattt gattctcagt 1740

caacccaact tcaatcagca agtgggtcag atggtagtac aaggctggct tgatagtaaa 1800

aagttagcct ttggccaaaa ctacgatgtc ggggcattgc agagtgtttt agcccccaat 1860

ctccttgccc aacaacgggg tcgggcccaa cgggatcaag cccaaaaggt ctatcaccaa 1920

tacgaacaca agttgcagat tttagcctat caagttaacc cccaagaccc caaccgagcc 1980

accgttactg cccgggtaga agaaattagc cagcccttta ccctaggtaa tcaacagcag 2040

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gtttggaaaa ttgaccaaat acaagtggta aatggccccc gttag 2145

<210> 169
<211> 714
<212> PRT
<213> Synechocystis PCC6803

<400> 169

Met Phe Ile Pro Leu Asp Phe Tyr Arg Ile Leu Gly Ile Pro Pro Gln
1 5 10 15

Ser Gly Gly Glu Thr Ile Glu Gln Ala Tyr Gln Asp Arg Leu Leu Gln
20 25 30

Leu Pro Arg Arg Glu Phe Ser Asp Ala Ala Val Thr Leu Arg Asn Gln
35 40 45

Leu Leu Ala Ile Ala Tyr Glu Thr Leu Arg Asp Pro Glu Lys Arg Gln
50 55 60

Ala Tyr Asp Gln Glu Trp Trp Gly Ala Met Asp Glu Ala Leu Gly Glu
65 70 75 80

Ala Leu Pro Leu Thr Thr Pro Glu Leu Glu Cys Ser Pro Glu Gln Glu
85 90 95

Ile Gly Ala Leu Leu Ile Leu Leu Asp Leu Gly Glu Tyr Glu Leu Val
100 105 110

Val Lys Tyr Gly Glu Pro Val Leu His Asp Pro Asn Pro Pro Ala Gly
115 120 125

Gly Leu Pro Gln Asp Tyr Leu Leu Ser Val Ile Leu Ala His Trp Glu
130 135 140

Leu Ser Arg Glu Arg Trp Gln Gln Gln Gln Tyr Glu Phe Ala Ala Thr
145 150 155 160

Ala Ser Leu Lys Ala Leu Ala Arg Leu Gln Gln Asp Asn Asp Phe Pro
165 170 175

Ala Leu Glu Ala Glu Ile Arg Gln Glu Leu Tyr Arg Leu Arg Pro Tyr
180 185 190

Arg Ile Leu Glu Leu Leu Ala Lys Glu Gly Gln Gly Glu Glu Gln Arg
195 200 205

Gln Gln Gly Leu Ala Leu Leu Gln Ala Met Val Gln Asp Arg Gly Gly
210 215 220

Ile Glu Gly Lys Gly Glu Asp Tyr Ser Gly Leu Gly Asn Asp Asp Phe
225 230 235 240

Leu Lys Phe Ile His Gln Leu Arg Cys His Leu Thr Val Ala Glu Gln
245 250 255

Asn Ala Leu Phe Leu Pro Glu Ser Gln Arg Pro Ser Leu Val Ala Ser
260 265 270

Tyr Leu Ala Val His Ser Leu Met Ala Glu Gly Val Lys Glu Gln Asp
275 280 285

Pro Met Ala Ile Val Glu Ala Lys Ser Leu Ile Ile Gln Leu Glu Asn
290 295 300

Cys Gln Asp Leu Ala Leu Glu Lys Val Ile Cys Glu Leu Leu Leu Gly
305 310 315 320

Gln Thr Glu Val Val Leu Ala Ala Ile Asp Gln Gly Asp Pro Lys Ile
325 330 335

Val Ala Gly Leu Glu Ser Lys Leu Ala Thr Gly Glu Asp Pro Leu Thr
340 345 350

Ala Phe Tyr Thr Phe Thr Glu Gln Trp Leu Glu Glu Glu Ile Val Pro
355 360 365

Tyr Phe Arg Asp Leu Ser Pro Glu Thr Leu Ser Pro Lys Ala Tyr Phe
370 375 380

Asn Asn Pro Ser Val Gln Gln Tyr Leu Glu Gln Leu Glu Pro Asp Ser
385 390 395 400

Phe Thr Thr Asp Asn Ser Phe Ala Ser Pro Ala Leu Leu Ser Thr Ala
405 410 415

Thr Glu Ser Glu Thr Pro Met Val His Ser Ser Ala Ala Leu Pro Asp
420 425 430

Arg Pro Leu Thr Ser Thr Val Pro Ser Arg Arg Gly Arg Ser Pro Arg
435 440 445

Arg Ser Arg Asp Asp Val Phe Pro Ser Ala Asp Asn Ser Ser Gly Leu
450 455 460

Ala Val Thr Thr Leu Ser Pro Ala Ile Ala Tyr Asp Thr His Ser Leu
465 470 475 480

Gly Thr Asn Gly Ile Gly Gly Asp Ser Thr Ser Asn Gly Phe Ser Ser
485 490 495

Asn Ser Ala Pro Glu Ser Thr Ser Lys His Lys Ser Pro Arg Arg Arg
500 505 510

Lys Lys Arg Val Thr Ile Lys Pro Val Arg Phe Gly Ile Phe Leu Leu
515 520 525

Cys Leu Ala Gly Ile Val Gly Gly Ala Thr Ala Leu Ile Ile Asn Arg
530 535 540

Thr Gly Asp Pro Leu Gly Gly Leu Leu Glu Asp Pro Leu Asp Val Phe
545 550 555 560

Leu Asp Gln Pro Ser Glu Phe Ile Pro Asp Glu Ala Thr Ser Arg Asn
565 570 575

Leu Ile Leu Ser Gln Pro Asn Phe Asn Gln Gln Val Gly Gln Met Val
580 585 590

Val Gln Gly Trp Leu Asp Ser Lys Lys Leu Ala Phe Gly Gln Asn Tyr
595 600 605

Asp Val Gly Ala Leu Gln Ser Val Leu Ala Pro Asn Leu Leu Ala Gln
610 615 620

Gln Arg Gly Arg Ala Gln Arg Asp Gln Ala Gln Lys Val Tyr His Gln
625 630 635 640

Tyr Glu His Lys Leu Gln Ile Leu Ala Tyr Gln Val Asn Pro Gln Asp
645 650 655

Pro Asn Arg Ala Thr Val Thr Ala Arg Val Glu Glu Ile Ser Gln Pro
660 665 670

Phe Thr Leu Gly Asn Gln Gln Gln Lys Gly Ser Ala Thr Lys Asp Asp
675 680 685

Leu Thr Val Arg Tyr Gln Leu Val Arg His Gln Gly Val Trp Lys Ile
690 695 700

Asp Gln Ile Gln Val Val Asn Gly Pro Arg
705 710

<210> 170
<211> 714
<212> PRT
<213> Synechocystis PCC6803

<400> 170

Met Phe Ile Pro Leu Asp Phe Tyr Arg Ile Leu Gly Ile Pro Pro Gln
1 5 10 15

Ser Gly Gly Glu Thr Ile Glu Gln Ala Tyr Gln Asp Arg Leu Leu Gln
20 25 30

Leu Pro Arg Arg Glu Phe Ser Asp Ala Ala Val Thr Leu Arg Asn Gln
35 40 45

Leu Leu Ala Ile Ala Tyr Glu Thr Leu Arg Asp Pro Glu Lys Arg Gln
50 55 60

Ala Tyr Asp Gln Glu Trp Trp Gly Ala Met Asp Glu Ala Leu Gly Glu
65 70 75 80

Ala Leu Pro Leu Thr Thr Pro Glu Leu Glu Cys Ser Pro Glu Gln Glu
85 90 95

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Ile Gly Ala Leu Leu Ile Leu Leu Asp Leu Gly Glu Tyr Glu Leu Val
            100                 105                 110

Val Lys Tyr Gly Glu Pro Val Leu His Asp Pro Asn Pro Pro Ala Gly
        115                 120                 125

Gly Leu Pro Gln Asp Tyr Leu Leu Ser Val Ile Leu Ala His Trp Glu
    130                 135                 140

Leu Ser Arg Glu Arg Trp Gln Gln Gln Gln Tyr Glu Phe Ala Ala Thr
145                 150                 155                 160

Ala Ser Leu Lys Ala Leu Ala Arg Leu Gln Gln Asp Asn Asp Phe Pro
                165                 170                 175

Ala Leu Glu Ala Glu Ile Arg Gln Glu Leu Tyr Arg Leu Arg Pro Tyr
            180                 185                 190

Arg Ile Leu Glu Leu Leu Ala Lys Glu Gly Gln Gly Glu Glu Gln Arg
        195                 200                 205

Gln Gln Gly Leu Ala Leu Leu Gln Ala Met Val Gln Asp Arg Gly Gly
    210                 215                 220

Ile Glu Gly Lys Gly Glu Asp Tyr Ser Gly Leu Gly Asn Asp Asp Phe
225                 230                 235                 240

Leu Lys Phe Ile His Gln Leu Arg Cys His Leu Thr Val Ala Glu Gln
                245                 250                 255

Asn Ala Leu Phe Leu Pro Glu Ser Gln Arg Pro Ser Leu Val Ala Ser
            260                 265                 270

Tyr Leu Ala Val His Ser Leu Met Ala Glu Gly Val Lys Glu Gln Asp
        275                 280                 285

Pro Met Ala Ile Val Glu Ala Lys Ser Leu Ile Ile Gln Leu Glu Asn
    290                 295                 300

Cys Gln Asp Leu Ala Leu Glu Lys Val Ile Cys Glu Leu Leu Leu Gly
305                 310                 315                 320
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Gln Thr Glu Val Val Leu Ala Ala Ile Asp Gln Gly Asp Pro Lys Ile
                325                 330                 335

Val Ala Gly Leu Glu Ser Lys Leu Ala Thr Gly Glu Asp Pro Leu Thr
            340                 345                 350

Ala Phe Tyr Thr Phe Thr Glu Gln Trp Leu Glu Glu Glu Ile Val Pro
        355                 360                 365

Tyr Phe Arg Asp Leu Ser Pro Glu Thr Leu Ser Pro Lys Ala Tyr Phe
    370                 375                 380

Asn Asn Pro Ser Val Gln Gln Tyr Leu Glu Gln Leu Glu Pro Asp Ser
385                 390                 395                 400

Phe Thr Thr Asp Asn Ser Phe Ala Ser Pro Ala Leu Leu Ser Thr Ala
                405                 410                 415

Thr Glu Ser Glu Thr Pro Met Val His Ser Ser Ala Ala Leu Pro Asp
            420                 425                 430

Arg Pro Leu Thr Ser Thr Val Pro Ser Arg Arg Gly Arg Ser Pro Arg
        435                 440                 445

Arg Ser Arg Asp Asp Val Phe Pro Ser Ala Asp Asn Ser Ser Gly Leu
    450                 455                 460

Ala Val Thr Thr Leu Ser Pro Ala Ile Ala Tyr Asp Thr His Ser Leu
465                 470                 475                 480

Gly Thr Asn Gly Ile Gly Gly Asp Ser Thr Ser Asn Gly Phe Ser Ser
                485                 490                 495

Asn Ser Ala Pro Glu Ser Thr Ser Lys His Lys Ser Pro Arg Arg Arg
            500                 505                 510

Lys Lys Arg Val Thr Ile Lys Pro Val Arg Phe Gly Ile Phe Leu Leu
        515                 520                 525

Cys Leu Ala Gly Ile Val Gly Gly Ala Thr Ala Leu Ile Ile Asn Arg
    530                 535                 540
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Thr Gly Asp Pro Leu Gly Gly Leu Leu Glu Asp Pro Leu Asp Val Phe
545 550 555 560

Leu Asp Gln Pro Ser Glu Phe Ile Pro Asp Glu Ala Thr Ser Arg Asn
565 570 575

Leu Ile Leu Ser Gln Pro Asn Phe Asn Gln Gln Val Gly Gln Met Val
580 585 590

Val Gln Gly Trp Leu Asp Ser Lys Lys Leu Ala Phe Gly Gln Asn Tyr
595 600 605

Asp Val Gly Ala Leu Gln Ser Val Leu Ala Pro Asn Leu Leu Ala Gln
610 615 620

Gln Arg Gly Arg Ala Gln Arg Asp Gln Ala Gln Lys Val Tyr His Gln
625 630 635 640

Tyr Glu His Lys Leu Gln Ile Leu Ala Tyr Gln Val Asn Pro Gln Asp
645 650 655

Pro Asn Arg Ala Thr Val Thr Ala Arg Val Glu Glu Ile Ser Gln Pro
660 665 670

Phe Thr Leu Gly Asn Gln Gln Gln Lys Gly Ser Ala Thr Lys Asp Asp
675 680 685

Leu Thr Val Arg Tyr Gln Leu Val Arg His Gln Gly Val Trp Lys Ile
690 695 700

Asp Gln Ile Gln Val Val Asn Gly Pro Arg
705 710

<210> 171
<211> 819
<212> PRT
<213> Arabidopsis thaliana

<400> 171

Met Pro Val Ala Tyr Thr Phe Pro Val Leu Pro Ser Ser Cys Leu Leu
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Cys Gly Ile Ser Asn Arg Ser Thr Ser Phe Val Val Asp Arg Pro Glu
20 25 30

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Leu Gln Ile Ser Gly Leu Leu Val Val Arg Ser Glu Ser Gly Glu Phe
        35                  40                  45

Phe Gly Ser Gly Leu Ser Leu Arg Arg Phe Gln Arg Glu Gly Arg Arg
    50                  55                  60

Arg Leu Asn Ala Ala Gly Gly Gly Ile His Val Val Asp Asn Ala Pro
65                  70                  75                  80

Ser Arg Thr Ser Ser Leu Ala Ala Ser Thr Ser Thr Ile Glu Leu Pro
                85                  90                  95

Val Thr Cys Tyr Gln Leu Ile Gly Val Ser Glu Gln Ala Glu Lys Asp
            100                 105                 110

Glu Val Val Lys Ser Val Ile Asn Leu Lys Lys Thr Asp Ala Glu Glu
        115                 120                 125

Gly Tyr Thr Met Glu Ala Ala Ala Ala Arg Gln Asp Leu Leu Met Asp
    130                 135                 140

Val Arg Asp Lys Leu Leu Phe Glu Ser Glu Tyr Ala Gly Asn Leu Lys
145                 150                 155                 160

Glu Lys Ile Ala Pro Lys Ser Pro Leu Arg Ile Pro Trp Ala Trp Leu
                165                 170                 175

Pro Gly Ala Leu Cys Leu Leu Gln Glu Val Gly Gln Glu Lys Leu Val
            180                 185                 190

Leu Asp Ile Gly Arg Ala Ala Leu Arg Asn Leu Asp Ser Lys Pro Tyr
        195                 200                 205

Ile His Asp Ile Phe Leu Ser Met Ala Leu Ala Glu Cys Ala Ile Ala
    210                 215                 220

Lys Ala Ala Phe Glu Val Asn Lys Val Ser Gln Gly Phe Glu Ala Leu
225                 230                 235                 240

Ala Arg Ala Gln Ser Phe Leu Lys Ser Lys Val Thr Leu Gly Lys Leu
                245                 250                 255
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Ala Leu Leu Thr Gln Ile Glu Glu Ser Leu Glu Gly Leu Ala Pro Pro
            260                 265                 270

Cys Thr Leu Asp Leu Leu Gly Leu Pro Arg Thr Pro Glu Asn Ala Glu
        275                 280                 285

Arg Arg Arg Gly Ala Ile Ala Ala Leu Arg Glu Leu Leu Arg Gln Gly
    290                 295                 300

Leu Ser Val Glu Ala Ser Cys Gln Ile Gln Asp Trp Pro Cys Phe Leu
305                 310                 315                 320

Ser Gln Ala Ile Ser Arg Leu Leu Ala Thr Glu Ile Val Asp Leu Leu
                325                 330                 335

Pro Trp Asp Asp Leu Ala Ile Thr Arg Lys Asn Lys Lys Ser Leu Glu
            340                 345                 350

Ser His Asn Gln Arg Val Val Ile Asp Phe Asn Cys Phe Tyr Met Val
        355                 360                 365

Leu Leu Gly His Ile Ala Val Gly Phe Ser Gly Lys Gln Asn Glu Thr
    370                 375                 380

Ile Asn Lys Ala Lys Thr Ile Cys Glu Cys Leu Ile Ala Ser Glu Gly
385                 390                 395                 400

Val Asp Leu Lys Phe Glu Glu Ala Phe Cys Ser Phe Leu Leu Lys Gln
                405                 410                 415

Gly Ser Glu Ala Glu Ala Leu Glu Lys Leu Lys Gln Leu Glu Ser Asn
            420                 425                 430

Ser Asp Ser Ala Val Arg Asn Ser Ile Leu Gly Lys Glu Ser Arg Ser
        435                 440                 445

Thr Ser Ala Thr Pro Ser Leu Glu Ala Trp Leu Met Glu Ser Val Leu
    450                 455                 460

Ala Asn Phe Pro Asp Thr Arg Gly Cys Ser Pro Ser Leu Ala Asn Phe
465                 470                 475                 480
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Phe Arg Ala Glu Lys Lys Tyr Pro Glu Asn Lys Lys Met Gly Ser Pro
485 490 495

Ser Ile Met Asn His Lys Thr Asn Gln Arg Pro Leu Ser Thr Thr Gln
500 505 510

Phe Val Asn Ser Ser Gln His Leu Tyr Thr Ala Val Glu Gln Leu Thr
515 520 525

Pro Thr Asp Leu Gln Ser Pro Val Val Ser Ala Lys Asn Asn Asp Glu
530 535 540

Thr Ser Ala Ser Met Pro Ser Val Gln Leu Lys Arg Asn Leu Gly Val
545 550 555 560

His Lys Asn Lys Ile Trp Asp Glu Trp Leu Ser Gln Ser Ser Leu Ile
565 570 575

Gly Arg Val Ser Val Val Ala Leu Leu Gly Cys Thr Val Phe Phe Ser
580 585 590

Leu Lys Leu Ser Gly Ile Arg Ser Gly Arg Leu Gln Ser Met Pro Ile
595 600 605

Ser Val Ser Ala Arg Pro His Ser Glu Ser Asp Ser Phe Leu Trp Lys
610 615 620

Thr Glu Ser Gly Asn Phe Arg Lys Asn Leu Asp Ser Val Asn Arg Asn
625 630 635 640

Gly Ile Val Gly Asn Ile Lys Val Leu Ile Asp Met Leu Lys Met His
645 650 655

Cys Gly Glu His Pro Asp Ala Leu Tyr Leu Lys Ser Ser Gly Gln Ser
660 665 670

Ala Thr Ser Leu Ser His Ser Ala Ser Glu Leu His Lys Arg Pro Met
675 680 685

Asp Thr Glu Glu Ala Glu Glu Leu Val Arg Gln Trp Glu Asn Val Lys
690 695 700

```
Ala Glu Ala Leu Gly Pro Thr His Gln Val Tyr Ser Leu Ser Glu Val
705                 710                 715                 720

Leu Asp Glu Ser Met Leu Val Gln Trp Gln Thr Leu Ala Gln Thr Ala
                725                 730                 735

Glu Ala Lys Ser Cys Tyr Trp Arg Phe Val Leu Leu His Leu Glu Val
            740                 745                 750

Leu Gln Ala His Ile Phe Glu Asp Gly Ile Ala Gly Glu Ala Ala Glu
        755                 760                 765

Ile Glu Ala Leu Leu Glu Glu Ala Ala Glu Leu Val Asp Glu Ser Gln
    770                 775                 780

Pro Lys Asn Ala Lys Tyr Tyr Ser Thr Tyr Lys Ile Arg Tyr Ile Leu
785                 790                 795                 800

Lys Lys Gln Glu Asp Gly Leu Trp Lys Phe Cys Gln Ser Asp Ile Gln
                805                 810                 815

Ile Gln Lys
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<210> 172
<211> 2857
<212> DNA
<213> Arabidopsis thaliana

<400> 172

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caacaaattg taccatgatt ccagcttcac tctacttctt ctagggttcg ttcgttttct    120

ggagctgttg cgcaatgcca gtagcttaca catttccagt tctcccttct tcttgtctgc    180

tttgcggaat ctccaatcgc agcaccagct tcgtcgtaga tcgcccggag cttcagatct    240

caggtctcct cgtcgttcgt tctgaatccg gtgaattctt cggttctggt ttatctttgc    300

ggcggtttca gcgagaagga cggaggaggt tgaatgctgc tggtggtggt atccatgtcg    360

tcgacaatgc gccgtctcgt acttcttctc tcgctgcatc tacctctaca atcgaactcc    420

cggttacgtg ttaccagctt atcggagttt ctgagcaagc tgagaaagac gaggtcgtta    480

agtcggttat aaatttgaaa aaaactgatg ctgaagaggg ttatacaatg gaagctgctg    540

cagctcgcca ggatcttctc atggatgtta gggataaact tctttttgaa tcagaatatg    600
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gccgggctgc tctcaggaac cttgattcaa agccatatat tcatgatata ttcttatcta 780

tggcacttgc tgagtgtgca attgccaagg ctgctttcga ggttaacaag gtctctcaag 840

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ttgcattgtt aactcagatt gaggagtcac tagaggggct tgcaccacct tgcacattgg 960

atctactggg cctgccacgc acgccagaaa atgcagagag gaggcgaggt gcaattgccg 1020

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tagcatcaga aggtgttgat ctgaaatttg aggaagcttt ttgctcattt cttctaaaac 1380

agggttccga ggcagaggcc ctggaaaaac ttaagcagct ggaatcaaat tcagactctg 1440

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cttcgatcat gaatcataag acgaaccaaa gaccactttc cacaacacag ttcgtgaact 1680

cgtcacaaca tctttataca gctgtcgagc agttgacacc aacagatttg cagagcccag 1740

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cagaatcaga ttcttttctg tggaaaacag agtctgggaa tttcagaaaa aaccttgatt 2040

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attgtggcga acatccggat gccctgtatc tgaaaagctc tggtcaatca gctacatcat 2160

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gcctttccga agtccttgat gaatccatgc ttgtccagtg gcaaacattg gcacaaacag 2340

cagaggcgaa atcctgttat tggaggttcg ttctgcttca tcttgaggtt ttgcaagcac 2400

atatattcga agatggtatt gctggtgagg ctgcagaaat cgaagctctt ctggaggaag 2460

cagcagaatt agttgatgaa tctcagccca aaaacgcaaa atattatagc acttacaaga 2520

tccgatatat tctgaagaag caagaagatg gattgtggaa attctgccaa agcgatattc 2580

aaatacagaa gtgaaaatcc cccagaaaaa aaagctcatc atctaactaa aggttgtagc 2640

atcaacagta gaacatggga tcatttagct aacggttgtt cttgtttacc taacggtgta 2700

ggaaagtctc aggtttgttt ctttattcct tagtaaccca caggatttgt ctttgtagat 2760

tcttttgatt tcaatgtgtt tatggataaa caaacttctt gagtattttt tttattatta 2820

ttgtaaagcg ttactgatca caaaaaaaaa aaaaaaa 2857

<210> 173
<211> 819
<212> PRT
<213> Arabidopsis thaliana

<400> 173

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Cys Gly Ile Ser Asn Arg Ser Thr Ser Phe Val Val Asp Arg Pro Glu
20 25 30

Leu Gln Ile Ser Gly Leu Leu Val Val Arg Ser Glu Ser Gly Glu Phe
35 40 45

Phe Gly Ser Gly Leu Ser Leu Arg Arg Phe Gln Arg Glu Gly Arg Arg
50 55 60

Arg Leu Asn Ala Ala Gly Gly Gly Ile His Val Val Asp Asn Ala Pro
65 70 75 80

Ser Arg Thr Ser Ser Leu Ala Ala Ser Thr Ser Thr Ile Glu Leu Pro
85 90 95

Val Thr Cys Tyr Gln Leu Ile Gly Val Ser Glu Gln Ala Glu Lys Asp
100 105 110

Glu Val Val Lys Ser Val Ile Asn Leu Lys Lys Thr Asp Ala Glu Glu
115 120 125

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Gly Tyr Thr Met Glu Ala Ala Ala Arg Gln Asp Leu Leu Met Asp
    130                 135                 140

Val Arg Asp Lys Leu Leu Phe Glu Ser Glu Tyr Ala Gly Asn Leu Lys
145                 150                 155                 160

Glu Lys Ile Ala Pro Lys Ser Pro Leu Arg Ile Pro Trp Ala Trp Leu
                165                 170                 175

Pro Gly Ala Leu Cys Leu Leu Gln Glu Val Gly Gln Glu Lys Leu Val
            180                 185                 190

Leu Asp Ile Gly Arg Ala Ala Leu Arg Asn Leu Asp Ser Lys Pro Tyr
        195                 200                 205

Ile His Asp Ile Phe Leu Ser Met Ala Leu Ala Glu Cys Ala Ile Ala
    210                 215                 220

Lys Ala Ala Phe Glu Val Asn Lys Val Ser Gln Gly Phe Glu Ala Leu
225                 230                 235                 240

Ala Arg Ala Gln Ser Phe Leu Lys Ser Lys Val Thr Leu Gly Lys Leu
                245                 250                 255

Ala Leu Leu Thr Gln Ile Glu Glu Ser Leu Glu Gly Leu Ala Pro Pro
            260                 265                 270

Cys Thr Leu Asp Leu Leu Gly Leu Pro Arg Thr Pro Glu Asn Ala Glu
        275                 280                 285

Arg Arg Arg Gly Ala Ile Ala Ala Leu Arg Glu Leu Leu Arg Gln Gly
    290                 295                 300

Leu Ser Val Glu Ala Ser Cys Gln Ile Gln Asp Trp Pro Cys Phe Leu
305                 310                 315                 320

Ser Gln Ala Ile Ser Arg Leu Leu Ala Thr Glu Ile Val Asp Leu Leu
                325                 330                 335

Pro Trp Asp Asp Leu Ala Ile Thr Arg Lys Asn Lys Lys Ser Leu Glu
            340                 345                 350

Ser His Asn Gln Arg Val Val Ile Asp Phe Asn Cys Phe Tyr Met Val
        355                 360                 365
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```
Leu Leu Gly His Ile Ala Val Gly Phe Ser Gly Lys Gln Asn Glu Thr
    370                 375                 380

Ile Asn Lys Ala Lys Thr Ile Cys Glu Cys Leu Ile Ala Ser Glu Gly
385                 390                 395                 400

Val Asp Leu Lys Phe Glu Glu Ala Phe Cys Ser Phe Leu Leu Lys Gln
                405                 410                 415

Gly Ser Glu Ala Glu Ala Leu Glu Lys Leu Lys Gln Leu Glu Ser Asn
            420                 425                 430

Ser Asp Ser Ala Val Arg Asn Ser Ile Leu Gly Lys Glu Ser Arg Ser
        435                 440                 445

Thr Ser Ala Thr Pro Ser Leu Glu Ala Trp Leu Met Glu Ser Val Leu
    450                 455                 460

Ala Asn Phe Pro Asp Thr Arg Gly Cys Ser Pro Ser Leu Ala Asn Phe
465                 470                 475                 480

Phe Arg Ala Glu Lys Lys Tyr Pro Glu Asn Lys Lys Met Gly Ser Pro
                485                 490                 495

Ser Ile Met Asn His Lys Thr Asn Gln Arg Pro Leu Ser Thr Thr Gln
            500                 505                 510

Phe Val Asn Ser Ser Gln His Leu Tyr Thr Ala Val Glu Gln Leu Thr
        515                 520                 525

Pro Thr Asp Leu Gln Ser Pro Val Val Ser Ala Lys Asn Asn Asp Glu
    530                 535                 540

Thr Ser Ala Ser Met Pro Ser Val Gln Leu Lys Arg Asn Leu Gly Val
545                 550                 555                 560

His Lys Asn Lys Ile Trp Asp Glu Trp Leu Ser Gln Ser Ser Leu Ile
                565                 570                 575

Gly Arg Val Ser Val Val Ala Leu Leu Gly Cys Thr Val Phe Phe Ser
            580                 585                 590
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Leu Lys Leu Ser Gly Ile Arg Ser Gly Arg Leu Gln Ser Met Pro Ile
595 600 605

Ser Val Ser Ala Arg Pro His Ser Glu Ser Asp Ser Phe Leu Trp Lys
610 615 620

Thr Glu Ser Gly Asn Phe Arg Lys Asn Leu Asp Ser Val Asn Arg Asn
625 630 635 640

Gly Ile Val Gly Asn Ile Lys Val Leu Ile Asp Met Leu Lys Met His
645 650 655

Cys Gly Glu His Pro Asp Ala Leu Tyr Leu Lys Ser Ser Gly Gln Ser
660 665 670

Ala Thr Ser Leu Ser His Ser Ala Ser Glu Leu His Lys Arg Pro Met
675 680 685

Asp Thr Glu Glu Ala Glu Glu Leu Val Arg Gln Trp Glu Asn Val Lys
690 695 700

Ala Glu Ala Leu Gly Pro Thr His Gln Val Tyr Ser Leu Ser Glu Val
705 710 715 720

Leu Asp Glu Ser Met Leu Val Gln Trp Gln Thr Leu Ala Gln Thr Ala
725 730 735

Glu Ala Lys Ser Cys Tyr Trp Arg Phe Val Leu Leu His Leu Glu Val
740 745 750

Leu Gln Ala His Ile Phe Glu Asp Gly Ile Ala Gly Glu Ala Ala Glu
755 760 765

Ile Glu Ala Leu Leu Glu Glu Ala Ala Glu Leu Val Asp Glu Ser Gln
770 775 780

Pro Lys Asn Ala Lys Tyr Tyr Ser Thr Tyr Lys Ile Arg Tyr Ile Leu
785 790 795 800

Lys Lys Gln Glu Asp Gly Leu Trp Lys Phe Cys Gln Ser Asp Ile Gln
805 810 815

Ile Gln Lys

<210> 174
<211> 491
<212> DNA
<213> Triticum aestivum

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<223> n is a, c, g, or t

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<223> n is a, c, g, or t

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<222> (483)..(484)
<223> n is a, c, g, or t

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<222> (487)..(487)
<223> n is a, c, g, or t

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<222> (489)..(490)
<223> n is a, c, g, or t

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gacaaggttc cgggtgtgct atgtgccctt caggaggctg gggaggcaca ggcagtgctt 180

gcaattggag agcacttact ggaggaccgc ccgcccaagc ggttcaagca ggatgtggtg 240

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gatgtaatcc gctgctgtga ggtgcttgaa agggctctca agctcttgca ggaggatggg 360

gcaatcaacc ttgcacctgg tctgctttca caaattgatg aaactctgga ggagatcaca 420

cctcgttgtg ttttggagct tcttgcccct nctcttgatg aaaaacatca nattgaacgc 480

cannaangnn t 491

<210> 175
<211> 545
<212> DNA
<213> Gossypium arboreum

<220>
<221> misc_feature
<222> (528)..(528)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (536)..(536)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (540)..(540)
<223> n is a, c, g, or t

<400> 175
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tcaccgcctt gataaattgc cagaggttct ggatggtcaa atgttgaaga catggacaga 120

tcgtgcagcc gaaatcgctc agcttggttg ggtatatgaa tatagtctac tgaacatggc 180

cattgacagt gttacccttt cactagatgg ccagcgagct gtagtcgaag ctactctgga 240

agaatccacc tgcttgactg atgttcatca tccggagaac aatgcctcta atgtaaactc 300

ctacaccacg agatatgaga tgtcttgttc caactcaggc tggaaaatca ctgaaggatc 360

tgtctacaaa tcttaactat gatgtataaa gcataaaaag cctgaaagct ccaatgtggt 420

taccagcttt gccttttttac gtagctatat ttgttatatt gtttgagaaa acaagagtta 480

gcgttttcca gtcatgcaag cagttcaaat taaaagaggc aatgcttntc atgganaacn 540

aaatg 545

<210> 176
<211> 420
<212> DNA
<213> Hordeum vulgare

<400> 176
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tggcagagca tcaaatccaa ggccttggga tcagatcatt ctgttgcatc attgcaagag 120

gttcttgatg gcaacatgct gaaggtatgg acagaccgag cagcagagat tgagcgcaaa 180

ggctggttct gggactacac gctgttcaac gtggcgatcg acagcatcac cgtctccctg 240

gacggacggc gggcgaccgt ggaggcgaca attgaggagg cgggtcagct caccgacgca 300

accgacccca ggaacgatga tttgtacgac actaagtaca ccacccggta cgagatggcc 360

ttcaccggac caggagggtg gaagataacc gaaggcgcag tcctcaagtc gtcatagggc 420

<210> 177
<211> 606
<212> DNA
<213> Triticum aestivum

<400> 177
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aaatacaaca caagaaaaat aaagctcttc gtcgatcaca tcagactaac gcaactatcg 120

gtcttccaaa ctaaaaaggg cctagactgc ctgcttattt acacaccccc aaaagaaaac 180

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ggaccgcgcc ttccattatc ttccaccctc ctagtccggt gaaggtcatc tcataccggg 300

tggtgtactt cgtgtcgtac gagtcgttgt tcttggggtc ggttgcgtcg atgagctggc 360

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ctgctcggtc cgtccatacc ttcagcatgt tgccatcaag aacctcttgc aatgattcca 540

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ctgcca 606

<210> 178
<211> 563
<212> DNA
<213> Gossypium arboreum

<400> 178
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atcatagtta aaatttgtag acagatcctt cagtgatttt ccaacctgag ttggaacaaa 240

acatctcata tttcgtgggg taggagttta cattacaggc attgttctcc ggatgatgaa 300

cattactcaa gccgggggggt tcttccaaaa taacttcgac tacagctcgc tggccattta 360

atgaaagggt aacactgtca atggccctgt tcagtcaact ttattcatat acccaaccca 420

gctgaccgat ttcggctgca ccaactgtcc atgttttcaa catttgacca tccaaaacct 480

ttggcaattt atcaaggggg ggatcaagtc caaacgcctc agatttaatg ttctgccact 540

tgcgaacaat gccttttgca att 563

<210> 179
<211> 360
<212> DNA
<213> Hordeum vulgare

<400> 179
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tggcagagca tcaaatccaa ggccttggga tcagatcatt ctgttgcatc attgcaagag 120

gttcttgatg gcaacatgct gaaggtatgg acagaccgag cagcagagat tgagcgcaaa 180

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gacggacggc gggcgaccgt ggaggcgaca attgaggagg cgggtcagct caccgacgca 300

accgacccca ggaacgatga tttgtacgac actaagtaca ccacccggta cgagatggcc 360

<210> 180
<211> 300
<212> DNA
<213> Hordeum vulgare

<400> 180
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acggcgggcg accgtggagg cgacaattga ggaggcgggt cagctcaccg acgcaaccga 180

ccccaggaac gatgatttgt acgacactaa gtacaccacc cggtacgaga tggccttcac 240

cggaccagga gggtggaaga taaccgaagg cgcagtcctc aagtcgtcat agggcgttca 300

<210> 181
<211> 549
<212> DNA
<213> Triticum monococcum

<400> 181
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ccccaactca aagatcttct aagctagcaa taatccgaaa acgacacagg gaaaaacaaa 120

gctcatcgct gattgcacat cagactaacc aaactatctc caacttccaa actgagaagg 180

gcctagactg cttatttaca caccaaaaag aacacgggag gaatcaatca acaaaggtct 240

actgcacacc gaacgcccta tgacgacttg aggaccgcac cttctgttat cttccaccct 300

cctggtccag tgaaggtcat ctcgtaccgg gtggtgtact tagtgtcgta caaatcgttg 360

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gcccgtcgtc cgtccaggga gacggtgatg ctgtcaatcg ccacgtcgga cagcgtgtag 480

tcccagaacc agcctttgcg ctcgatctct gctgctcggt ccctccatac cttcagcatg 540

ttgccatca 549

<210> 182
<211> 573
<212> DNA
<213> Hordeum vulgare

<220>
<221> misc_feature
<222> (6)..(6)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (16)..(16)
<223> n is a, c, g, or t

<400> 182
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tgggtacacg gaggaggtgt ccacctgcag acaggctctg ctgctggacg tgagagacaa 120

gcttctcttt gaacaggagt acgcaggaag caccagggcc aaggttccgc ccagatcctc 180

tcttcatata ccctggagct ggttgcctgc tgccttgtgt gtcttgcagg aggttgggga 240

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gaaaaaacca tctttagaga agatgcctct tcttgagcag atcgaagaat cacttgaaga 480

gcttgcacca gcttgcactc tagaggtttt aagcctgccc cgtacacctg aaaattctga 540

acgcaggcgt ggtgctattg cagctctctg tga 573

<210> 183
<211> 400
<212> DNA
<213> Beta vulgaris

<400> 183
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ataatatcga gcaagaatcg gttactgaga agataaaaga tttaggtgtg aaggttatgt 180

gtgccggtgt ggtgattgga ctgacaactt tggctggcat gaaacttttg cctggcagaa 240

gtgggtctgc cattccacac aggcatcttg gttctgctgt ggcttctgat gtctccagtg 300

tggggctctc agtaaatgaa actactgagg agaaagtacc aaaaatggat gcaagacttg 360

cagaagttct agttagaaga tggcagaacg ttaaatcaca 400

<210> 184
<211> 631
<212> DNA
<213> Prunus persica

<220>
<221> misc_feature
<222> (21)..(21)
<223> n is a, c, g, or t

<400> 184
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gaaagctttg aagtttatgg ggtggctctt gcgcttgttg ctcaagcctt tgttggtaaa 180

aaacctcatc acattcaaga tgctgaaaac ctattccaga aacttcagca gtctaaggta 240

acagctgtag gacattctct tgacaactat ataaccaaag aaagcagtga gatagacttt 300

gctttggaga ggggactctg ttcacttctt ctaggggacc ttgatgacag tcgttcgtgg 360

ttgggcctag acagtaatga ttcaccatat agaaatccat ctgttgtaga ctttgtcttg 420

gagaactcaa aggatgacga tgacaatgac aatgacaatg atcttcctgg actttgcaag 480

ctattggaga cgtggttgat ggaggtggta ttccccaggt ttagagacac caaagacata 540

gagttcagac tgggagacta ctatgatgat cctacagtct tgagatactt agaaaggctg 600

gatggcacta atggttcacc cttagctgct g 631

<210> 185
<211> 647
<212> DNA
<213> Helianthus annuus

<400> 185
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ggctctacta gtactactgc tcgtaaagaa gttgattcgg ctctggcttc agacgtcacc 120

aatgtggagg attctagggt tgaggatgct gaagacattc ctaaaatgga tgcaagatta 180

gccgaaggtc tagttcgtaa gtggcagagc ataaaatccc aagcccttgg acctgagcat 240

tgccactcaa aattatcata ggtattagat ggtgaaatgc acaagatctg gcttcaacgg 300

gcaaccgaaa ttgctcaacg tggttggttt tgggactaca cgcttttaaa cattaccatt 360

gacagtgtta ccgtttcact cgatgggcgc ttagctgttg tggaagcaac ccttgaagag 420

tctgccaagt tgattgattt gacccacccg gaaaacaatg actcctataa tttaacttac 480

accacacgtt atgagatgtc gtgtgccaag tcatcatgga aaatcacaaa gggggctgtc 540

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actcagcagt tgaatgatat gtttctccac catttcgatc atgagcg 647

<210> 186
<211> 652
<212> DNA
<213> Helianthus annuus

<400> 186
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tactagtact actgctcgta aagaagttga ttcggctctg gcttcagacg tcaccaatag 120

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ctagttcgta agtggcagag cataaaatcc caagcccttg gacctgagca ttgccactca 240

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ttgaatgata tgtttctcca ccatatcgat catgagtgta tttggtgctg cc 652

<210> 187
<211> 460
<212> DNA
<213> Populus tremula

<400> 187
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gaaattggtt cggcaatggc atctgacacc atcaatttga attcagcagt agatgaacaa 180

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ggcctaaatg ctgtagtaga agcaacactc aaagagtcaa 460

<210> 188
<211> 3933
<212> DNA
<213> Chlamydomonas reinhardtii

<400> 188
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<210> 189
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<212> DNA
<213> Chlamydomonas reinhardtii

<400> 189
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agggcgctgg ccacccgctg gctggagggc gtggcgctgg cgtccttccg cgacactgcc 1560

ggcagccccg tgccgccgct ggaggccagc tggttcgcgg acctgcgtgt cgccttctat 1620

ctgcaggtat ggcggctgtg ccgcgtggag caggtgctgg ccgccgccca cttcctggcc 1680

aacctgctgc ccaacatgct caaggccatc gccggcactg ccgtcaaggt cgcagccaac 1740

accgccgtgg cagcctcccg cgcgcagcgc ctcagcgcca ccgtcgcggc cagcaccgcc 1800

accgcctcgt catcttcctc tgccgcccgc ggcgctcgtg ccggtgccct gagcgctgcc 1860

accgccgccg cacacgccgc gcgccgccag caggcgaacg cggtcggtgc cagcatcgtc 1920

ggtgctgacg tgctgccccc cacagcagtg gccgcggctg ccgcggctgg cacagcggcc 1980

gccgccgcag tcaccggccc cgccctcggc cgtggcgctg cagcttccgc ctcttccttt 2040

gaggagggcg ccgctgaggc cgctgacctg cgtcgtcgct ttgtcgccac cagccgcggc 2100

gccagcgcgg ccgtcggtgc gcccacagca ccagccgcta tgactgggcc ccagcacggc 2160

gccgcctctg ctgcgcagtc gcaccgggag gaggatgagg attcgcacgg cggccaggag 2220

gggggcgtgc cgcggcgcat gagcgaggcg gacctgcgtg cgcacctggc gggcctggag 2280

aaggccatgt gggactcgga gctgccgccg ccgccgccat cccgcgcgca gaaggcgctc 2340

acctacgccg caggactgct ggccgtggtg gtggccttcc tggtgtccag cttcttccgc 2400

cgcaacgacg gcgccgcctc cgccctggca cccgccgccg tcaccaccgc ctccgtggcc 2460

gttagcgcgc agcccgccaa gccgggcaag gccacccgct ccgcgcactg a 2511

<210> 190
<211> 836
<212> PRT
<213> Chlamydomonas reinhardtii

<400> 190

Met Asn Ser Ala Glu His Val Ser Val Ala Val Asp Tyr Tyr Arg Met
1 5 10 15

Leu His Val Pro Arg Val Ser Arg Pro Asp Ala Ile Arg Lys Ala Tyr
20 25 30

Glu Asn Leu Val Lys Gln Pro Pro Ala Ala Ala Tyr Ser Ala Asp Thr
35 40 45

Leu Phe Ala Arg Ala Val Leu Leu Lys Ala Ala Ala Glu Ser Leu Thr
50 55 60

Asp Pro Asp Leu Arg Arg Ser Tyr Asp Ala Lys Leu Ala Ala Gly His
65 70 75 80

Thr Ala Leu Arg Val Ser Gln Gln Asp Leu Pro Gly Ala Leu Val Val
85 90 95

Leu Gln Glu Ile Gly Glu His Gln Leu Val Leu Asp Leu Gly Leu Arg
100 105 110

Trp Leu Glu Val Asn Gly Gly Gln Pro Asp Ala Gly Asp Val Ala Ala
115 120 125

Ala Val Ala Leu Ala Tyr Cys Asp Arg Ala Gly Glu Arg Leu Thr Ser
130 135 140

```
Gln Leu Gln Pro Pro Pro Ala Ser Ala Leu Pro Gly Pro Asp Gly Ala
145                 150                 155                 160

Ala Val Pro His Ala His Val Gly Ala Val Leu Pro Ala Cys Asp Asp
                165                 170                 175

Leu Asp Ala Ala Leu Ser Lys Leu Arg Arg Tyr Gly Met Ala Gln Gln
            180                 185                 190

Leu Gln Gln Gln Ile Val Gly Ala Leu Arg Asp Leu Ala Pro Glu Tyr
        195                 200                 205

Ala Cys Glu Leu Ala Ala Leu Pro Leu Gly Ala Glu Thr Ala Ala Arg
    210                 215                 220

Arg Ala Lys Gly Val Ala Leu Met Arg Gly Val Leu Arg Ala Ala Ala
225                 230                 235                 240

Thr Val Ala Ala Ala Thr Ala Lys Pro Glu Ala Ala Ala Asp Asp Ser
                245                 250                 255

Asp Asp Asp Glu Val Asp Pro Arg Ser Val Leu Ala Ala Ala Arg Arg
            260                 265                 270

Met Leu Thr Arg Ser Arg Asp Val Leu Thr Cys Ser Glu Gln Val Ala
        275                 280                 285

Leu Leu Pro Asp Ala Leu Arg Gly Ser Gly Val Ser Pro Thr Pro Asp
    290                 295                 300

Ala Leu Tyr Asp Gly Ala Leu Ala His Leu Val Asp Gly Phe Arg Asn
305                 310                 315                 320

Gly Trp Pro His Ser Val His Gln Ala Asp Gln Leu Leu Ala Lys Leu
                325                 330                 335

Glu Ala Gln Gln Ala Arg Ala Ala Ala Met Arg Arg Glu Gln Ser Glu
            340                 345                 350

Leu Ala Ala Ala Ala Ala Ala Arg Arg Ala Met Tyr Ser Gly Pro Ala
        355                 360                 365

Ala Ala His Gly Pro Thr Leu Tyr Thr Asn Tyr Asn Asn Pro Ala Gly
    370                 375                 380
```

Ser Gly Asn Gly Ala Pro Pro Pro Pro Arg Pro Met Pro Met Val
385 390 395 400

Pro Arg Gly Asp Gly Gln His Ala Met Ala Ala Ser Val Ala Ala His
405 410 415

Val His Ser Thr Ala Met Ala Glu His Ala Ala Arg Ser Ala Ala Gly
420 425 430

Gly Ala Ala Gly Ala Ser Asp Gly Gly Ala His Ala Asn Gly Val Ala
435 440 445

Leu Glu Arg Ala Val Cys Ala Val Leu Leu Gly Asp Tyr Thr Ala Ala
450 455 460

Val Glu Arg Leu Gly Leu Asp Thr Asn Ala Ala Val Glu Gln Glu Gln
465 470 475 480

Leu Arg Glu Phe Val Leu Ala His Ser Pro Asn Gly Arg Gly Asp Leu
485 490 495

Arg Pro Gly Leu Arg Ala Leu Ala Thr Arg Trp Leu Glu Gly Val Ala
500 505 510

Leu Ala Ser Phe Arg Asp Thr Ala Gly Ser Pro Val Pro Pro Leu Glu
515 520 525

Ala Ser Trp Phe Ala Asp Leu Arg Val Ala Phe Tyr Leu Gln Val Trp
530 535 540

Arg Leu Cys Arg Val Glu Gln Val Leu Ala Ala Ala His Phe Leu Ala
545 550 555 560

Asn Leu Leu Pro Asn Met Leu Lys Ala Ile Ala Gly Thr Ala Val Lys
565 570 575

Val Ala Ala Asn Thr Ala Val Ala Ala Ser Arg Ala Gln Arg Leu Ser
580 585 590

Ala Thr Val Ala Ala Ser Thr Ala Thr Ala Ser Ser Ser Ser Ser Ala
595 600 605

Ala Arg Gly Ala Arg Ala Gly Ala Leu Ser Ala Ala Thr Ala Ala Ala
610 615 620

His Ala Ala Arg Arg Gln Gln Ala Asn Ala Val Gly Ala Ser Ile Val
625 630 635 640

Gly Ala Asp Val Leu Pro Pro Thr Ala Val Ala Ala Ala Ala Ala Ala
645 650 655

Gly Thr Ala Ala Ala Ala Ala Val Thr Gly Pro Ala Leu Gly Arg Gly
660 665 670

Ala Ala Ala Ser Ala Ser Ser Phe Glu Glu Gly Ala Ala Glu Ala Ala
675 680 685

Asp Leu Arg Arg Arg Phe Val Ala Thr Ser Arg Gly Ala Ser Ala Ala
690 695 700

Val Gly Ala Pro Thr Ala Pro Ala Ala Met Thr Gly Pro Gln His Gly
705 710 715 720

Ala Ala Ser Ala Ala Gln Ser His Arg Glu Glu Asp Glu Asp Ser His
725 730 735

Gly Gly Gln Glu Gly Gly Val Pro Arg Arg Met Ser Glu Ala Asp Leu
740 745 750

Arg Ala His Leu Ala Gly Leu Glu Lys Ala Met Trp Asp Ser Glu Leu
755 760 765

Pro Pro Pro Pro Pro Ser Arg Ala Gln Lys Ala Leu Thr Tyr Ala Ala
770 775 780

Gly Leu Leu Ala Val Val Val Ala Phe Leu Val Ser Ser Phe Phe Arg
785 790 795 800

Arg Asn Asp Gly Ala Ala Ser Ala Leu Ala Pro Ala Ala Val Thr Thr
805 810 815

Ala Ser Val Ala Val Ser Ala Gln Pro Ala Lys Pro Gly Lys Ala Thr
820 825 830

Arg Ser Ala His
835

<210> 191
<211> 2022
<212> DNA
<213> Thermosynechococcus elongatus

<400> 191
gtgcgcattc ccctcgatta ttaccaagtg ttgggtgtgc ctattcaggc aacgccggag 60

caaattgagc aggcctttcg ggaccggctg ttgcagctcc ctacccatca gcactccccc 120

accacagttg ccacccgtcg cgaactcatt gagcaggcct atgcagtttt gcgagaaccg 180

gagcagcgcg atgcctacga tcgccactgc cgtaccgttg atcccgatga tttgattgcc 240

cagttggatc ccgatgccac cactccccac attgaaatta gtgatgagca attgtcgggg 300

gcactcctac tgctgtatga actaggaaat tatgcccaag ttgtcaacct gggagacgcc 360

tttcttaaaa aggatgtttt tgagcgcaat cgcccctaca cttcccctgc cgccgttgcc 420

gacattaccc tcactgtggc tttggcctat ctggaattgg gacgggagga atggcagcgg 480

cagtcctatg aatcagccgc ctctcagcta gaagccggtc tccaggtact tcagcgggta 540

aatttgtttc ccgagctcca ggagcagttt cagacggaac tgaatcggct gcgtccctac 600

cgcattctgg aattactggc actgcctttg tccgatagtg cgaatcggca gcggggtatt 660

ttattgctgc ggcaaatgct gagtgagcgc gggggcattg aggggcgcgg tgacgatcgc 720

tcaggactaa cagttgagga ttttctgaaa tttattttgc aactgcgcag ccatcttacc 780

gtggcagaac aacaggaact ctttgaacgg gaatcgcggc gtccctcagc ggtggccacc 840

taccttgcgg tacatgcctt ggtagcacgg ggagtgcatg aactgcagcc gagctatatt 900

tgtcgggcca aggatttatt gcagcagctg ctcccccatc aagacgtcta tcttgaactt 960

gccagttgct tgctgctttt gggacagccc accgaggcct tggcagctct tgaccacagc 1020

caagatcaac cgactctgga ctttatccgc cgtcatgccg gtgaggctgg cgatcgactg 1080

ccggggcttt attactacac cacacaatgg ctcacggagg aaatttatcc tgcatttcgg 1140

gacttggggg aaacacccgt ggccttggag gcttactttg ctgatgccaa tgtccaaacc 1200

tatctagagg ctctcagtga ggactccatt gcccctgaac cccctgcgac cactgcctct 1260

gcgctccctg aagtgatcag accaacggtg gccgtgcccc ctcccctctc cttcacagcg 1320

gaaacgttac cgttgcagga tcagagtcgg ctgggtcagg gcctttcggc atcggctttt 1380

acccccttctg caactgcaac ggggacatcg atgccccaac catcgcctcg caaacggcgc 1440

agccctcgaa accgttgcgc ccaaaaacgt cagacttggt tttggatggg tgcaggagtg 1500

gttcttgtgg gtttaggggc gttggcaaaa gtctattggc ccgccaaaac cgctgaagcc 1560

cccccgccgc cggtgacacc ggcaccaact cctgtggcaa cgccgacccc aacgccacaa 1620

ccgacgacct tagccatcac tttaacacca gagatggcgc gcgatcgcct ccacacttgg 1680

cagcaaatta aagcccaagc ccttgggcga ccatttgagg tggacaaact aacaacgatt 1740

ttggcggagc cagaactcag ccgctggcga tcgcgggcac agggcttaaa gtccgagggc 1800

agctattggg tttataccct aaagaactta gaagtgaagg aagtccgcct ccaaaggagc 1860

gatcgtgtgg aggtgttggc agaagtcaac gaggatgccc gtttctatga acagggaacc 1920

ctgcgcactg atatttccta tagcgatccc taccgggtca tttatacctt tatccgtcgc 1980

ggcaatcaat ggttgattca aggcatgcag gtggttagtt aa 2022

<210> 192
<211> 673
<212> PRT
<213> Thermosynechococcus elongatus

<400> 192

Met Arg Ile Pro Leu Asp Tyr Tyr Gln Val Leu Gly Val Pro Ile Gln
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Ala Thr Pro Glu Gln Ile Glu Gln Ala Phe Arg Asp Arg Leu Leu Gln
20 25 30

Leu Pro Thr His Gln His Ser Pro Thr Thr Val Ala Thr Arg Arg Glu
35 40 45

Leu Ile Glu Gln Ala Tyr Ala Val Leu Arg Glu Pro Glu Gln Arg Asp
50 55 60

Ala Tyr Asp Arg His Cys Arg Thr Val Asp Pro Asp Asp Leu Ile Ala
65 70 75 80

Gln Leu Asp Pro Asp Ala Thr Thr Pro His Ile Glu Ile Ser Asp Glu
85 90 95

Gln Leu Ser Gly Ala Leu Leu Leu Leu Tyr Glu Leu Gly Asn Tyr Ala
100 105 110

```
Gln Val Val Asn Leu Gly Asp Ala Phe Leu Lys Lys Asp Val Phe Glu
        115                 120                 125

Arg Asn Arg Pro Tyr Thr Ser Pro Ala Ala Val Ala Asp Ile Thr Leu
    130                 135                 140

Thr Val Ala Leu Ala Tyr Leu Glu Leu Gly Arg Glu Glu Trp Gln Arg
145                 150                 155                 160

Gln Ser Tyr Glu Ser Ala Ala Ser Gln Leu Glu Ala Gly Leu Gln Val
                165                 170                 175

Leu Gln Arg Val Asn Leu Phe Pro Glu Leu Gln Glu Gln Phe Gln Thr
            180                 185                 190

Glu Leu Asn Arg Leu Arg Pro Tyr Arg Ile Leu Glu Leu Leu Ala Leu
        195                 200                 205

Pro Leu Ser Asp Ser Ala Asn Arg Gln Arg Gly Ile Leu Leu Leu Arg
    210                 215                 220

Gln Met Leu Ser Glu Arg Gly Gly Ile Glu Gly Arg Gly Asp Asp Arg
225                 230                 235                 240

Ser Gly Leu Thr Val Glu Asp Phe Leu Lys Phe Ile Leu Gln Leu Arg
                245                 250                 255

Ser His Leu Thr Val Ala Glu Gln Gln Glu Leu Phe Glu Arg Glu Ser
            260                 265                 270

Arg Arg Pro Ser Ala Val Ala Thr Tyr Leu Ala Val His Ala Leu Val
        275                 280                 285

Ala Arg Gly Val His Glu Leu Gln Pro Ser Tyr Ile Cys Arg Ala Lys
    290                 295                 300

Asp Leu Leu Gln Gln Leu Leu Pro His Gln Asp Val Tyr Leu Glu Leu
305                 310                 315                 320

Ala Ser Cys Leu Leu Leu Leu Gly Gln Pro Thr Glu Ala Leu Ala Ala
                325                 330                 335
```

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Leu Asp His Ser Gln Asp Gln Pro Thr Leu Asp Phe Ile Arg Arg His
            340                 345                 350

Ala Gly Glu Ala Gly Asp Arg Leu Pro Gly Leu Tyr Tyr Tyr Thr Thr
        355                 360                 365

Gln Trp Leu Thr Glu Glu Ile Tyr Pro Ala Phe Arg Asp Leu Gly Glu
    370                 375                 380

Thr Pro Val Ala Leu Glu Ala Tyr Phe Ala Asp Ala Asn Val Gln Thr
385                 390                 395                 400

Tyr Leu Glu Ala Leu Ser Glu Asp Ser Ile Ala Pro Glu Pro Pro Ala
                405                 410                 415

Thr Thr Ala Ser Ala Leu Pro Glu Val Ile Arg Pro Thr Val Ala Val
            420                 425                 430

Pro Pro Pro Leu Ser Phe Thr Ala Glu Thr Leu Pro Leu Gln Asp Gln
        435                 440                 445

Ser Arg Leu Gly Gln Gly Leu Ser Ala Ser Ala Phe Thr Pro Ser Ala
    450                 455                 460

Thr Ala Thr Gly Thr Ser Met Pro Gln Pro Ser Pro Arg Lys Arg Arg
465                 470                 475                 480

Ser Pro Arg Asn Arg Cys Ala Gln Lys Arg Gln Thr Trp Phe Trp Met
                485                 490                 495

Gly Ala Gly Val Val Leu Val Gly Leu Gly Ala Leu Ala Lys Val Tyr
            500                 505                 510

Trp Pro Ala Lys Thr Ala Glu Ala Pro Pro Pro Pro Val Thr Pro Ala
        515                 520                 525

Pro Thr Pro Val Ala Thr Pro Thr Pro Thr Pro Gln Pro Thr Thr Leu
    530                 535                 540

Ala Ile Thr Leu Thr Pro Glu Met Ala Arg Asp Arg Leu His Thr Trp
545                 550                 555                 560
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Gln Gln Ile Lys Ala Gln Ala Leu Gly Arg Pro Phe Glu Val Asp Lys
565 570 575

Leu Thr Thr Ile Leu Ala Glu Pro Glu Leu Ser Arg Trp Arg Ser Arg
580 585 590

Ala Gln Gly Leu Lys Ser Glu Gly Ser Tyr Trp Val Tyr Thr Leu Lys
595 600 605

Asn Leu Glu Val Lys Glu Val Arg Leu Gln Arg Ser Asp Arg Val Glu
610 615 620

Val Leu Ala Glu Val Asn Glu Asp Ala Arg Phe Tyr Glu Gln Gly Thr
625 630 635 640

Leu Arg Thr Asp Ile Ser Tyr Ser Asp Pro Tyr Arg Val Ile Tyr Thr
645 650 655

Phe Ile Arg Arg Gly Asn Gln Trp Leu Ile Gln Gly Met Gln Val Val
660 665 670

Ser

<210> 193
<211> 2370
<212> DNA
<213> Trichodesmium erythraeum

<400> 193
gtgcggattc cattagatta ttatcgaatt ttaggtttac caattcaggc tactgctgaa 60

cagttgcggc aggcacatca agaccgcact cagcagtttc ctagaaggga gtattctgaa 120

gccacaatag ttgctcgtaa acagcttata gatgaggctt atgctgttct ttgcgatcct 180

gaacaacgtc aaacctatga tggtaacttt ttagctaaaa cctacgagcc aatagtagaa 240

gaactcaatc caagttctca gataaatttt gatcaagcac aagaaaaaga aaccacactt 300

aaggagacta gagaagttct tccggaaata gcttctaaac agttaaaaaa aaggacaagt 360

tatcaaaaca gagagactaa agctgcctct gattttcatt ctaatacccc tagtatagaa 420

atagaatatc cacaatttgt gggagccatc ctaattttac atgagctagg agaatatgag 480

ctagtattaa aaataactca cccttatctt cttaacaata gtataactat taaagatgga 540

cgttttggag acccagcatt agttttgcca gatgttgtcc ttacagttgc tctagcaaat 600

ttagaattgg gcagagagga atggcaacaa ggacaatacg aaagtgcagc tacagcttta 660

gaggctggcc tagggttatt gctacgagaa aacctatttg tccaaatacg aggagagata 720

caagctgacc tttataagct acgtccttat agaataatgg agctaatagc actaccagag 780

gaaatagctc tagaccgtag ccgtggacta gaaattcttc aagatatgct caatgaacgg 840

ggaggaattg atggtcaagg tgaagatagc tctggacttg ggatagaaga ttttctaaag 900

tttgttcagc agctacgtca atacttaact acagcagagc aaaagaagtt atttgaggca 960

gaagcccttc gcccttccgc agttggtgca tatctagcgg tttatacttt tttagctcaa 1020

gggtttgctc aaaaacaacc agcctttatt cgtaaagcta agttgatgtt aatgcaattg 1080

ggtcggagtc aagatgtaaa tttagagaaa tctgtctgtg ctttactttt agggcaaact 1140

gaagaagcta gtcgttcatt agaacttagc catgaaaatg aacctctatc ctttattaaa 1200

gaaaattctc aacaatctcc agatttattg ccaggtctat gtctctatgc tgaacattgg 1260

ttgacagagg aggtttttcc acatttccgt gatttgtctg acaagtcagc ttctttgaaa 1320

gattattttg cagatcaaca tgttcaagct tatctagaag ctttacctac agaagcagag 1380

gtagctaatc aatgggtagt cgttcagcct cgtcgtagta atcacaataa aaaacaaatg 1440

ttcgacccca aggaacttga gaagttgaat gtatcagatt tggaggataa agatatttct 1500

cgggtagatg ctactgctac tggtattgtt gcttctggaa gtcaaggaag ttctaattta 1560

ctaggggcta gttctgatgg gttgcttcaa gaattagaaa aatcatcatc tactagaggt 1620

gggccaaaac aagtaactac taagagttct agtcactatt taggaaaaat tagggaaaag 1680

agtataagtg gtttacctga gtttaatgaa agtacatcta ttgagagtgg ggggttaccc 1740

caatctatcc aagagcatag ttcacgtaga acttctgcta gaagagaacc tgttaagttt 1800

ggtcgtttaa tattaatcgc aattgtggga tttttgttaa taggatttat tgggttgtta 1860

acaattaaaa ctatcggctg gttagtaaat gctttaggat gggaaagaga aaaactgatg 1920

atacaattgg ataggcctcc tatagaaatc ccagaacctg atcgggttaa cctcgcagca 1980

tcaggaccga taacaaaaga agtagcaagg cgaacaattc aaagttggtt agatatcaag 2040

gcttctgctc ttggtcctaa tcataaaatt gaacaattac caaatatttt agtagaaccg 2100

gcactttctc gttggttacc tacagctaat gccctgaagc aagaaaagtc ataccgtagg 2160

tatgagcatg atttagaaat aagtaatata aagatgagta atacaaattc taatctcgct 2220

caagtagatg ctaaagtgat agaaaaggta gagttttatt ctgacaatgg tagattaact 2280

aatactaaca atgaaaactt atttgttcgt tatgatttag ttcgtaaaag tcaaaaatgg 2340

caaattagta attggaaggt attgagataa 2370

<210> 194
<211> 789
<212> PRT
<213> Trichodesmium erythraeum

<400> 194

Val Arg Ile Pro Leu Asp Tyr Tyr Arg Ile Leu Gly Leu Pro Ile Gln
1 5 10 15

Ala Thr Ala Glu Gln Leu Arg Gln Ala His Gln Asp Arg Thr Gln Gln
20 25 30

Phe Pro Arg Arg Glu Tyr Ser Glu Ala Thr Ile Val Ala Arg Lys Gln
35 40 45

Leu Ile Asp Glu Ala Tyr Ala Val Leu Cys Asp Pro Glu Gln Arg Gln
50 55 60

Thr Tyr Asp Gly Asn Phe Leu Ala Lys Thr Tyr Glu Pro Ile Val Glu
65 70 75 80

Glu Leu Asn Pro Ser Ser Gln Ile Asn Phe Asp Gln Ala Gln Glu Lys
85 90 95

Glu Thr Thr Leu Lys Glu Thr Arg Glu Val Leu Pro Glu Ile Ala Ser
100 105 110

Lys Gln Leu Lys Lys Arg Thr Ser Tyr Gln Asn Arg Glu Thr Lys Ala
115 120 125

Ala Ser Asp Phe His Ser Asn Thr Pro Ser Ile Glu Ile Glu Tyr Pro
130 135 140

Gln Phe Val Gly Ala Ile Leu Ile Leu His Glu Leu Gly Glu Tyr Glu
145 150 155 160

Leu Val Leu Lys Ile Thr His Pro Tyr Leu Leu Asn Asn Ser Ile Thr
165 170 175

```
Ile Lys Asp Gly Arg Phe Gly Asp Pro Ala Leu Val Leu Pro Asp Val
            180                 185                 190

Val Leu Thr Val Ala Leu Ala Asn Leu Glu Leu Gly Arg Glu Glu Trp
        195                 200                 205

Gln Gln Gly Gln Tyr Glu Ser Ala Ala Thr Ala Leu Glu Ala Gly Leu
    210                 215                 220

Gly Leu Leu Leu Arg Glu Asn Leu Phe Val Gln Ile Arg Gly Glu Ile
225                 230                 235                 240

Gln Ala Asp Leu Tyr Lys Leu Arg Pro Tyr Arg Ile Met Glu Leu Ile
                245                 250                 255

Ala Leu Pro Glu Glu Ile Ala Leu Asp Arg Ser Arg Gly Leu Glu Ile
            260                 265                 270

Leu Gln Asp Met Leu Asn Glu Arg Gly Gly Ile Asp Gly Gln Gly Glu
        275                 280                 285

Asp Ser Ser Gly Leu Gly Ile Glu Asp Phe Leu Lys Phe Val Gln Gln
    290                 295                 300

Leu Arg Gln Tyr Leu Thr Thr Ala Glu Gln Lys Lys Leu Phe Glu Ala
305                 310                 315                 320

Glu Ala Leu Arg Pro Ser Ala Val Gly Ala Tyr Leu Ala Val Tyr Thr
                325                 330                 335

Phe Leu Ala Gln Gly Phe Ala Gln Lys Gln Pro Ala Phe Ile Arg Lys
            340                 345                 350

Ala Lys Leu Met Leu Met Gln Leu Gly Arg Ser Gln Asp Val Asn Leu
        355                 360                 365

Glu Lys Ser Val Cys Ala Leu Leu Leu Gly Gln Thr Glu Glu Ala Ser
    370                 375                 380

Arg Ser Leu Glu Leu Ser His Glu Asn Glu Pro Leu Ser Phe Ile Lys
385                 390                 395                 400

Glu Asn Ser Gln Gln Ser Pro Asp Leu Leu Pro Gly Leu Cys Leu Tyr
                405                 410                 415
```

```
Ala Glu His Trp Leu Thr Glu Glu Val Phe Pro His Phe Arg Asp Leu
            420                 425                 430

Ser Asp Lys Ser Ala Ser Leu Lys Asp Tyr Phe Ala Asp Gln His Val
        435                 440                 445

Gln Ala Tyr Leu Glu Ala Leu Pro Thr Glu Ala Glu Val Ala Asn Gln
    450                 455                 460

Trp Val Val Val Gln Pro Arg Arg Ser Asn His Asn Lys Lys Gln Met
465                 470                 475                 480

Phe Asp Pro Lys Glu Leu Glu Lys Leu Asn Val Ser Asp Leu Glu Asp
                485                 490                 495

Lys Asp Ile Ser Arg Val Asp Ala Thr Ala Thr Gly Ile Val Ala Ser
            500                 505                 510

Gly Ser Gln Gly Ser Ser Asn Leu Leu Gly Ala Ser Ser Asp Gly Leu
        515                 520                 525

Leu Gln Glu Leu Glu Lys Ser Ser Ser Thr Arg Gly Gly Pro Lys Gln
    530                 535                 540

Val Thr Thr Lys Ser Ser Ser His Tyr Leu Gly Lys Ile Arg Glu Lys
545                 550                 555                 560

Ser Ile Ser Gly Leu Pro Glu Phe Asn Glu Ser Thr Ser Ile Glu Ser
                565                 570                 575

Gly Gly Leu Pro Gln Ser Ile Gln Glu His Ser Ser Arg Arg Thr Ser
            580                 585                 590

Ala Arg Arg Glu Pro Val Lys Phe Gly Arg Leu Ile Leu Ile Ala Ile
        595                 600                 605

Val Gly Phe Leu Leu Ile Gly Phe Ile Gly Leu Leu Thr Ile Lys Thr
    610                 615                 620

Ile Gly Trp Leu Val Asn Ala Leu Gly Trp Glu Arg Glu Lys Leu Met
625                 630                 635                 640
```

```
Ile Gln Leu Asp Arg Pro Pro Ile Glu Ile Pro Glu Pro Asp Arg Val
                645                 650                 655

Asn Leu Ala Ala Ser Gly Pro Ile Thr Lys Glu Val Ala Arg Arg Thr
            660                 665                 670

Ile Gln Ser Trp Leu Asp Ile Lys Ala Ser Ala Leu Gly Pro Asn His
        675                 680                 685

Lys Ile Glu Gln Leu Pro Asn Ile Leu Val Glu Pro Ala Leu Ser Arg
    690                 695                 700

Trp Leu Pro Thr Ala Asn Ala Leu Lys Gln Glu Lys Ser Tyr Arg Arg
705                 710                 715                 720

Tyr Glu His Asp Leu Glu Ile Ser Asn Ile Lys Met Ser Asn Thr Asn
                725                 730                 735

Ser Asn Leu Ala Gln Val Asp Ala Lys Val Ile Glu Lys Val Glu Phe
            740                 745                 750

Tyr Ser Asp Asn Gly Arg Leu Thr Asn Thr Asn Asn Glu Asn Leu Phe
        755                 760                 765

Val Arg Tyr Asp Leu Val Arg Lys Ser Gln Lys Trp Gln Ile Ser Asn
    770                 775                 780

Trp Lys Val Leu Arg
785
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<210> 195
<211> 765
<212> PRT
<213> Homo sapiens

<400> 195

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Met Gly Asn Arg Gly Met Glu Asp Leu Ile Pro Leu Val Asn Arg Leu
1               5                   10                  15

Gln Asp Ala Phe Ser Ala Ile Gly Gln Asn Ala Asp Leu Asp Leu Pro
            20                  25                  30

Gln Ile Ala Val Val Gly Gly Gln Ser Ala Gly Lys Ser Ser Val Leu
        35                  40                  45
```

```
Glu Asn Phe Val Gly Arg Val Thr Arg Arg Pro Leu Val Leu Gln Leu
    50                  55                  60

Val Asn Ala Thr Thr Glu Tyr Ala Glu Phe Leu His Cys Lys Gly Lys
65                  70                  75                  80

Lys Phe Thr Glu Ala Glu Thr Asp Arg Val Thr Gly Thr Asn Lys Gly
                85                  90                  95

Ile Ser Pro Val Pro Ile Asn Leu Arg Val Tyr Ser Pro His Val Leu
            100                 105                 110

Asn Leu Thr Leu Val Asp Leu Pro Gly Met Thr Lys Val Pro Val Gly
        115                 120                 125

Asp Gln Pro Pro Asp Ile Glu Phe Gln Ile Arg Asp Met Leu Met Gln
    130                 135                 140

Phe Val Thr Lys Glu Asn Cys Ser Asp Leu Ala Asn Ser Asp Ala Leu
145                 150                 155                 160

Lys Val Ala Lys Glu Val Asp Pro Gln Gly Gln Arg Thr Ile Gly Val
                165                 170                 175

Ile Thr Lys Leu Asp Leu Met Asp Glu Gly Thr Asp Ala Arg Asp Val
            180                 185                 190

Leu Glu Asn Lys Leu Leu Pro Leu Arg Arg Gly Tyr Ile Gly Val Val
        195                 200                 205

Asn Arg Ser Gln Lys Asp Ile Asp Gly Lys Lys Asp Ile Thr Phe Leu
    210                 215                 220

Ser His Pro Ser Tyr Arg His Leu Ala Asp Arg Met Gly Thr Pro Tyr
225                 230                 235                 240

Leu Gln Lys Val Leu Asn Gln Gln Leu Thr Asn His Ile Arg Asp Thr
                245                 250                 255

Leu Pro Gly Leu Arg Asn Lys Leu Gln Ser Gln Leu Leu Ser Ile Glu
            260                 265                 270
```

```
Lys Glu Val Glu Glu Tyr Lys Asn Phe Arg Pro Asp Asp Pro Ala Arg
        275                 280                 285

Lys Thr Lys Ala Leu Asp Phe Glu Lys Arg Ile Glu Gly Ser Gly Asp
    290                 295                 300

Gln Ile Asp Thr Tyr Glu Leu Ser Gly Gly Ala Arg Ile Asn Arg Ile
305                 310                 315                 320

Phe His Glu Arg Phe Pro Phe Glu Leu Val Lys Met Glu Phe Asp Glu
                325                 330                 335

Lys Glu Leu Arg Arg Glu Ile Ser Tyr Ala Ile Lys Asn Ile His Gly
            340                 345                 350

Ile Arg Thr Gly Leu Phe Thr Pro Asp Met Ala Lys Lys Ile Arg Glu
        355                 360                 365

Pro Cys Leu Lys Cys Val Asp Met Val Ile Ser Glu Leu Ile Ser Thr
    370                 375                 380

Val Arg Gln Cys Thr Lys Lys Leu Gln Gln Tyr Pro Arg Leu Arg Glu
385                 390                 395                 400

Glu Met Glu Arg Ile Val Thr Thr His Ile Arg Glu Arg Glu Gly Arg
                405                 410                 415

Thr Lys Glu Gln Val Met Met Asn Thr Asn His Glu Asp Phe Ile Gly
            420                 425                 430

Phe Ala Asn Ala Gln Gln Arg Ser Asn Gln Met Asn Lys Lys Lys Thr
        435                 440                 445

Ser Gly Asn Gln Asp Glu Ile Leu Val Ile Arg Lys Gly Trp Leu Thr
    450                 455                 460

Ile Asn Asn Ile Gly Ile Met Lys Gly Gly Ser Lys Glu Tyr Trp Phe
465                 470                 475                 480

Val Leu Thr Ala Glu Asn Leu Ser Trp Tyr Lys Asp Asp Ser Val Asp
                485                 490                 495
```

```
Asn Leu Lys Leu Arg Asp Val Glu Lys Gly Phe Met Ser Ser Lys His
            500                 505                 510

Ile Phe Ala Leu Phe Asn Thr Glu Gln Arg Asn Val Tyr Lys Asp Tyr
        515                 520                 525

Arg Gln Leu Glu Leu Ala Cys Glu Thr Gln Glu Glu Val Asp Ser Trp
    530                 535                 540

Lys Ala Ser Phe Leu Arg Ala Gly Val Tyr Pro Glu Arg Val Gly Asp
545                 550                 555                 560

Lys Glu Lys Asp Ser Phe Met His Ser Met Asp Pro Gln Leu Glu Arg
                565                 570                 575

Gln Val Glu Thr Ile Arg Asn Leu Val Asp Ser Tyr Met Ala Ile Val
            580                 585                 590

Asn Lys Thr Val Arg Asp Leu Met Pro Lys Thr Ile Met His Leu Met
        595                 600                 605

Ile Asn Asn Thr Lys Glu Phe Ile Phe Ser Glu Leu Leu Ala Asn Leu
    610                 615                 620

Tyr Ser Cys Gly Asp Gln Asn Thr Leu Met Arg Asp Glu Met Leu Arg
625                 630                 635                 640

Met Tyr His Ala Leu Lys Glu Ala Leu Ser Ile Ile Gly Asn Ile Asn
                645                 650                 655

Thr Thr Thr Val Ser Thr Pro Met Pro Pro Pro Val Asp Asp Ser Trp
            660                 665                 670

Leu Gln Val Gln Ser Val Pro Ala Gly Arg Arg Ser Pro Thr Ser Ser
        675                 680                 685

Pro Thr Pro Gln Arg Arg Ala Pro Ala Val Pro Pro Ala Arg Pro Gly
    690                 695                 700

Ser Ala Gly Ser Ala Leu Gly Gly Ala Pro Pro Val Pro Ser Arg Pro
705                 710                 715                 720
```

```
Gly Ala Ser Pro Asp Pro Phe Gly Pro Pro Gln Val Pro Ser Arg
                725                 730                 735

Pro Asn Arg Ala Pro Pro Gly Val Pro Ser Arg Ser Gly Gln Ala Ser
            740                 745                 750

Pro Ser Arg Pro Glu Ser Pro Arg Pro Pro Phe Asp Leu
        755                 760                 765
```

<210> 196
<211> 670
<212> PRT
<213> Saccharomyces cerevisiae

<400> 196

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Met Ala Ser Leu Glu Asp Leu Ile Pro Thr Val Asn Lys Leu Gln Asp
1               5                   10                  15

Val Met Tyr Asp Ser Gly Ile Asp Thr Leu Asp Leu Pro Ile Leu Ala
            20                  25                  30

Val Val Gly Ser Gln Ser Ser Gly Lys Ser Ser Ile Leu Glu Thr Leu
        35                  40                  45

Val Gly Arg Val Thr Arg Arg Pro Leu Val Leu Gln Leu Asn Asn Ile
    50                  55                  60

Ser Pro Asn Ser Pro Leu Ile Glu Glu Asp Asp Asn Ser Val Asn Pro
65                  70                  75                  80

His Asp Glu Val Thr Lys Ile Ser Gly Phe Glu Ala Gly Thr Lys Pro
                85                  90                  95

Leu Glu Tyr Arg Gly Lys Glu Arg Asn His Ala Asp Glu Trp Gly Glu
            100                 105                 110

Phe Leu His Ile Pro Gly Lys Arg Phe Tyr Glu Asn Glu Thr Ala Arg
        115                 120                 125

Ile Ala Gly Lys Asp Lys Gly Ile Ser Lys Ile Pro Ile Asn Leu Lys
    130                 135                 140

Val Phe Ser Pro His Val Leu Asn Leu Thr Leu Val Asp Leu Pro Gly
145                 150                 155                 160
```

Ile Thr Lys Val Pro Ile Gly Glu Gln Pro Pro Asp Ile Glu Lys Gln
165 170 175

Ile Lys Asn Leu Ile Leu Asp Tyr Ile Ala Thr Pro Asn Cys Val Asp
180 185 190

Leu Val Asn Ser Glu Ser Leu Lys Leu Ala Arg Glu Val Asp Pro Gln
195 200 205

Gly Lys Arg Thr Ile Gly Val Ile Thr Lys Leu Asp Leu Met Asp Ser
210 215 220

Gly Thr Asn Ala Leu Asp Ile Leu Ser Gly Lys Met Tyr Pro Leu Lys
225 230 235 240

Leu Gly Phe Val Gly Val Val Asn Arg Ser Gln Gln Asp Ile Gln Leu
245 250 255

Asn Lys Thr Val Glu Phe Arg Lys His Pro Val Tyr Arg Thr Ile Ser
260 265 270

Thr Lys Cys Gly Thr Arg Tyr Leu Ala Lys Leu Leu Asn Gln Thr Leu
275 280 285

Leu Ser His Ile Arg Asp Lys Leu Pro Asp Ile Lys Thr Lys Leu Asn
290 295 300

Thr Leu Ile Ser Gln Thr Glu Gln Glu Leu Ala Arg Tyr Gly Gly Val
305 310 315 320

Gly Ala Thr Thr Asn Glu Ser Arg Ala Ser Leu Val Asn Phe Ile Ser
325 330 335

Ser Ile Asp Gly Thr Ser Ser Asp Ile Asn Thr Lys Glu Leu Cys Gly
340 345 350

Gly Ala Arg Ile Tyr Tyr Ile Tyr Asn Asn Val Phe Gly Asn Ser Leu
355 360 365

```
Lys Ser Ile Asp Pro Thr Ser Asn Leu Ser Val Leu Asp Val Arg Thr
    370                 375                 380

Ala Ile Arg Asn Ser Thr Gly Pro Arg Pro Thr Leu Phe Val Pro Glu
385                 390                 395                 400

Leu Ala Lys Leu Leu Leu Glu Pro Ser Gln Arg Cys Val Glu Leu Val
                405                 410                 415

Tyr Glu Glu Leu Met Lys Ile Cys His Lys Cys Gly Ser Ala Glu Leu
            420                 425                 430

Ala Arg Tyr Pro Lys Leu Lys Ser Met Leu Ile Glu Val Ile Ser Glu
        435                 440                 445

Leu Leu Arg Glu Arg Leu Gln Pro Thr Arg Ser Tyr Val Glu Ile Asn
    450                 455                 460

Thr Asn His Pro Asn Phe Leu Ser Ala Thr Glu Ala Met Asp Asp Ile
465                 470                 475                 480

Met Lys Thr Arg Arg Lys Arg Asn Gln Glu Leu Leu Lys Ser Lys Leu
                485                 490                 495

Ser Gln Gln Glu Asn Gly Gln Thr Asn Gly Ile Asn Gly Thr Ser Ser
            500                 505                 510

Ile Ser Ser Asn Ile Asp Gln Asp Asp Gly Ile Asp Ala Glu Ser Lys
        515                 520                 525

Gln Thr Lys Asp Lys Phe Leu Asn Tyr Phe Phe Gly Lys Asp Lys Lys
    530                 535                 540

Gly Gln Pro Val Phe Asp Ala Ser Asp Lys Lys Arg Ser Ile Ala Gly
545                 550                 555                 560

Asp Gly Asn Ile Glu Asp Phe Arg Asn Leu Gln Ile Ser Asp Phe Ser
                565                 570                 575

Leu Gly Asp Ile Asp Asp Pro Leu Thr Glu Arg Glu Glu Leu Glu Cys
            580                 585                 590
```

Glu Leu Ile Lys Arg Leu Ile Val Ser Tyr Phe Asp Ile Ile Arg Glu
595 600 605

Met Ile Glu Asp Gln Val Pro Lys Ala Val Met Cys Leu Leu Val Asn
610 615 620

Tyr Cys Lys Asp Ser Val Gln Asn Arg Leu Val Thr Lys Leu Tyr Lys
625 630 635 640

Glu Thr Leu Phe Glu Glu Leu Leu Arg Glu Leu Cys Val Lys Ser Leu
645 650 655

Gly Val Tyr Lys Lys Ala Ala Thr Leu Ile Ser Asn Ile Leu
660 665 670

<210> 197
<211> 690
<212> PRT
<213> Arabidopsis thaliana

<400> 197

Met Ala Glu Val Ser Ala Lys Ser Val Thr Val Glu Glu Met Ala Glu
1 5 10 15

Glu Asp Asp Ala Ala Ile Glu Glu Arg Trp Ser Leu Tyr Glu Ala Tyr
20 25 30

Asn Glu Leu His Ala Leu Ala Gln Glu Leu Glu Thr Pro Phe Glu Ala
35 40 45

Pro Ala Val Leu Val Val Gly Gln Gln Thr Asp Gly Lys Ser Ala Leu
50 55 60

Val Glu Ala Leu Met Gly Phe Lys Thr Arg Arg Pro Ile Thr Leu His
65 70 75 80

Met Lys Tyr Asp Pro Gln Cys Gln Phe Pro Leu Cys His Leu Gly Ser
85 90 95

Asp Asp Asp Pro Ser Val Ser Leu Pro Lys Glu Ala Glu Asn Met Arg
100 105 110

Leu Glu Gln Glu Pro Cys Ser Pro Phe Ser Ala Lys Glu Ile Ile Val
115 120 125

```
Lys Val Gln Tyr Lys Tyr Cys Pro Asn Leu Thr Ile Ile Asp Thr Pro
    130                 135                 140

Gly Leu Ile Ala Pro Ala Pro Gly Leu Lys Asn Arg Ala Leu Gln Val
145                 150                 155                 160

Gln Ala Arg Ala Val Glu Ala Leu Val Arg Ala Lys Met Gln His Lys
                165                 170                 175

Glu Ser Asp Trp Ser Ile Ala Thr Thr Arg Arg Ile Val Met Gln Val
            180                 185                 190

Asp Pro Glu Leu Ser Arg Thr Ile Val Val Ser Thr Lys Leu Asp Thr
        195                 200                 205

Lys Ile Pro Gln Phe Ser Cys Ser Ser Asp Val Glu Val Phe Leu Ser
    210                 215                 220

Pro Pro Ala Ser Ala Leu Asp Ser Ser Leu Leu Gly Asp Ser Pro Phe
225                 230                 235                 240

Phe Tyr Gly Gln Asp Ser Val Tyr Lys Ser Asn Asp Glu Phe Lys Gln
                245                 250                 255

Ala Val Ser Leu Arg Glu Met Glu Asp Ile Ala Ser Leu Glu Lys Lys
            260                 265                 270

Leu Gly Arg Leu Leu Thr Lys Gln Glu Lys Ser Arg Ile Gly Ile Ser
        275                 280                 285

Lys Leu Arg Leu Phe Leu Glu Glu Leu Leu Trp Lys Arg Tyr Lys Glu
    290                 295                 300

Ser Val Pro Leu Ile Ile Pro Leu Arg Lys Leu Asp Thr Val Ser Lys
305                 310                 315                 320

Glu Leu Ser Ser Leu Asp Glu Ala Lys Leu Lys Glu Arg Gly Arg Thr
                325                 330                 335

Phe His Asp Leu Phe Leu Thr Lys Leu Ser Leu Leu Leu Lys Gly Thr
            340                 345                 350
```

Val Val Ala Pro Pro Asp Lys Phe Gly Glu Thr Leu Gln Asp Glu Arg
355 360 365

Thr Gln Gly Gly Ala Phe Val Gly Thr Asp Gly Leu Gln Phe Ser Arg
370 375 380

Leu Tyr Gly Gly Ala Gln Tyr His Arg Ala Met Ala Glu Phe Arg Phe
385 390 395 400

Leu Val Gly Ala Ile Lys Cys Pro Pro Ile Thr Arg Glu Glu Ile Val
405 410 415

Asn Ala Cys Gly Val Glu Asp Ile His Asp Gly Thr Asn Tyr Ser Arg
420 425 430

Thr Ala Cys Val Ile Ala Val Ala Lys Ala Arg Glu Thr Phe Glu Pro
435 440 445

Phe Leu His Gln Leu Gly Leu Leu Pro Ile Ser Val Tyr Leu Leu Gln
450 455 460

Lys Glu Gly Glu Tyr Leu Ser Gly His Glu Val Phe Leu Lys Arg Val
465 470 475 480

Ala Ser Ala Phe Asn Ser Phe Val Glu Ser Thr Glu Lys Ser Cys Arg
485 490 495

Asp Lys Cys Met Glu Asp Leu Ala Ser Thr Thr Arg Tyr Val Thr Trp
500 505 510

Ser Leu His Asn Lys Asn Ser Phe Gly Gly Thr Glu His Asn Thr Thr
515 520 525

Ser Gly Asn Ala Ile Gly Phe Ser Leu Pro Gln Asp Ala Leu Gly Gly
530 535 540

Thr Thr Asp Thr Lys Ser Arg Ser Asp Val Lys Leu Ser His Leu Ala
545 550 555 560

Ser Asn Ile Asp Ser Gly Ser Ser Ile Gln Thr Thr Glu Met Arg Leu
565 570 575

```
Ala Asp Leu Leu Asp Ser Thr Leu Trp Asn Arg Lys Leu Ile Val Tyr
            580                 585                 590

Ala Leu Val Gln Gln Ile Phe Gln Gly Ile Arg Glu Tyr Phe Leu Ala
        595                 600                 605

Ser Ala Glu Leu Lys Phe Asn Cys Phe Leu Leu Met Pro Ile Val Asp
    610                 615                 620

Lys Leu Pro Ala Leu Leu Arg Glu Glu Leu Glu Asn Ala Phe Glu Asp
625                 630                 635                 640

Asp Leu Asp Ser Ile Phe Asp Ile Thr Asn Leu Arg Thr Glu Ile Glu
                645                 650                 655

Leu Arg Arg Val Lys Arg Ile Lys Glu Lys Phe Arg Val Met Asn Glu
            660                 665                 670

Lys Leu Asn Ser His Glu Phe Ala Gln Asn Leu Lys Ala Pro Ser Val
        675                 680                 685

Gln His
    690
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<210> 198
<211> 712
<212> DNA
<213> Lactuca sativa

<220>
<221> misc_feature
<222> (608)..(608)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (656)..(656)
<223> n is a, c, g, or t

<400> 198
ttgttcagct ccgccaaaag aatccaagaa ttggcgtaat ccggctcgat tcttattgtg 60

aagggaccag gtgacataac gggtggtgct tattagatct tccatgcatt tttcatggca 120

tgatctttcg gtggattcag caaagttata gaaagcagat gaaacacgtc tcaagaaaac 180

ttcatggcca cttaggaatt cgccttcttt ctgaagaaga taaacggaga tgggaagtaa 240

tctcttgaga atgtgaagaa gtcgactgcc caactgatga agaaaaggtt caaaagtatc 300

acgagctttt gcaacagcga tgacacatgc agtcctggag taatttgttc catcatgaat 360

atcttcgacc ccacatgcat tcacaatttc ttcacgtgta attgcagggc attttatccc 420

tccaacaaca aacctaaatt cagccatggc acgatgatat tgtgcacctc catatagacg 480

catacctgca ttaggtatta gtttgtgtgg gaactgagag ccatcaatac cgattaatgc 540

ccctccatta accctctcat cttgtagtgt ttccccaaat ttatctggag gtgcaacaac 600

tgtccctntt catagcagtg ataacttggt aaggaaaaga tcatgaaaag atctcncttt 660

ctcctttagt ttgacttcat ctaaagtgct gagttcttga tttatgtcat tt 712

<210> 199
<211> 666
<212> DNA
<213> Medicago truncatula

<220>
<221> misc_feature
<222> (646)..(646)
<223> n is a, c, g, or t

<400> 199
atctaaagta acaaccacca caaaacacaa caatggagga agaaagagaa caccaccaac 60

tcaaagacaa agaagaaaac gagtggcgtc tctacgaagc ttacaatgaa cttcacgcgc 120

ttgctcaaga acttcacacg cctttcgacg cgccggcggt actggttgtg ggccaccaaa 180

cagacgggaa gagcgcctta gttgaggctc taatgggctt ccagttcaac cacgtcggtg 240

gtggcaccaa aacccgccgg cccattactc ttcacatgaa atatggccca cattgcgagt 300

ctccttcttg ctatcttctt tctgatgatg acccttctct ttctcaccat atgtcacttt 360

cccaaatcca gggttatatt gaagctgaga atgcgaggtt ggagcgtgac tcatgttgtc 420

aattttcagc taaggaaata atcataaaag tggaatacaa atactgtccc aatctcacca 480

taatagacac accaggatta gttgctcctg caccaggtcg taaaaatagg gcgatacagg 540

cacaggcacg agcggtagag tcactcgttc gtgcaaaaat gcagcacaag gagttcatta 600

tactctgtct tgaagattgt agtgattgga gcaatgcgac tacgangcgc gttgtaatgc 660

aaattg 666

<210> 200
<211> 663
<212> DNA
<213> Medicago truncatula

<400> 200
gtctttatgg gggtgcacaa tatcatcgag caatggctga atttcgtttt gtagttggag 60

gaatcaagtg ccctccaatt acccgggaag aaattgtaaa tgcttgtgga gttgaagaca 120

ttcatgatgg aacaaactac tctaggactg cttgtgtaat tgctgttgca aaggctcatg 180

atacatttga acctttttctt catcagttgg ggtctagatt gttgcacata cttaagagat 240

tgctcccaat ctctttttat cttcttcaga aagattgtga gtatctaagt ggccatcagg 300

tgttcctcag gcgtgttgcc tccgccttcg acaactttgc agaatccact gaaaaatcat 360

gccgtgaaaa atgtatggag gacttggtaa gcaccacacg atatgtctca tggtctctac 420

acaataagag tcgggcagga ttacgccagt tcttagattc atttggtgga acagaacatt 480

ccaatgtttg taatgatccc actgcaactg ttctatcaca aacaaatgtg caagagaagg 540

aagacacaaa gccacaacta gaagtaaagc tcagtcacgt ggcctctgga actgatccta 600

gcacatccac ccagacagct gaaacaaagc ttgctgacct tcttgatagt acactttgga 660

atc 663

<210> 201
<211> 622
<212> DNA
<213> Prunus persica

<220>
<221> misc_feature
<222> (609)..(609)
<223> n is a, c, g, or t

<400> 201
gcttatacct aacgcaggaa tgcgtttata tggtggtgca caataccacc gtgccatggc 60

tgagttccgc tttgtagttg gaggaataaa atgccctcca attacaaggg aagaaattgt 120

aaatgcatgt ggagttgaag atttacatga tggcacaaac tactcaagga cagcttgtgt 180

aatagccgtt gcaaaggccc gtgatacatt tgagcctttc cttcatcagt taggttgtag 240

actcttgcac attctaaaga gattacttcc tatatcagtc tatcttcttc agaaagatgg 300

tgagtattta agtggccatg aggtgtttct taggcgtgtt gcttctgctt tcaatgactt 360

tgcagaatct accgaaaggg catgtcgtga aaaatgcatg gaggatttag taagcaccac 420

ccgctatgtc acctggtccc ttcacaacaa gaatcgagct gggttacgtc aatttttaga 480

ctcgttcgct ggaacagaac ataacactat gggtagtaat tgcgtacctg ctggtatttc 540

ccaagattca tcctttgggt ctgttgccaa tgagaaggat actaagtcaa gggcagatgt 600

gaagctcanc catgtggcgt ct 622

<210> 202
<211> 752
<212> DNA
<213> Solanum tuberosum

<400> 202
gcgaatgtga ttcttcaaag gcaacaaagg ctgacggagg aatttgtgcc tcgtgcagat 60

ctgcttctgt ttctcatgtc tgctgatcga ccattaactg aaagtgaggt tagttttctg 120

cgttacactc agcagtggag taagaaggtc atttttgtgc tgaacaagtc tgacatatac 180

aagaataacg gcgagttgga ggaggccatt gcatttatca aagaaaatac acggaaattg 240

ctgaatacag aatccgtaac actgtatcca gtatctgcac ggctcgctct tgaatcaaag 300

ctttctactt ttgatggtgc ccttagtcaa aacaatggga gttcaaataa tgattctcac 360

tggaaaacca agagcttcta tgagcttgag aagtacttgt ctagcttttt ggattcatcc 420

acaagtactg gaattgagag aatgaagctg aagcttgaaa ctccaattgc cattgcagaa 480

caactacttt tagcttgtca aggacttgtg agacaagaat gtcagcaagc caaacaagac 540

ttgctgtttg ttgaggatct tgtcaacagc gtagaagagt gcacaaagaa gctggaagtt 600

gatagcattc tgtggaagag gcaggttcta tctctgataa actctgctca agcacgtgtt 660

gtccggcttg tagagtcaac gttacaactg tcaaatgttg atcttgtcgc tacatatgta 720

ttcagaagag aaaactctac tcaaatgcca gc 752

<210> 203
<211> 492
<212> DNA
<213> Glycine max

<400> 203
tgttgaatga agctattgaa gctatcaaga gggctgcacc tctgatggag gaggtttcac 60

ttcttaatga tgcggtttct caaattgatg agccattctt actggttata gtgggggaat 120

tcaactctgg taaatctacc gtgattaatg cgcttcttgg agaaagatat ctcaaagagg 180

gagttgttcc aacaactaat gagatcacat ttttacgata tactgactta gatattgaac 240

aacaacggtg tgaaaggcat ccagatggcc aatatatttg ctacattcct gctccaattc 300

ttaaagagat gaccattgtt gatacacctg gaactaatgt gattcttcag aggcagcagc 360

gtcttacaga ggaatttgta ccccgtgcag atttacttct ttttgtcatt tctgctgatc 420

gccctttaac tggaagtgag attgcttttc ttcgttattc tcagcagtgg aaaaagaaag 480

cggtctttgt ct 492

<210> 204
<211> 446
<212> DNA
<213> Lycopersicon esculentum

<400> 204
gagaccatta agtacaattc tataagcagt cttttgaaaa aagatggact tcattggtga 60

atccgtctga ccaaattgag ttaggaacaa ctggtgtgct ggatagaaaa tctgaagtta 120

ccataagtgt catagaggat ttcagtgctg cagctgcttc aaaattgctt gagagagata 180

ttcgtgaagt gttcttgggt acttttggtg gtcttggagc agctggttta tcagcgtcgc 240

ttctgacatc tgttcttcaa accacattag aagacctcct tgcacttggc ctttgttctg 300

ctggcgggtt attagcggtc ttcaacttct catcccggag acagcaagtg gtagataaag 360

taaagaggac tgctgatggc ctttcacgtg aactcgaaga ggctatgcag aaggagctct 420

tggagacgac tagtaatgtg gaggac 446

<210> 205
<211> 521
<212> DNA
<213> Populus balsamifera subsp. trichocarpa

<400> 205
tggtgttgtg ctgtctgatc aagggcttcc tgcccttgtg gcaagaaata tgatgatggg 60

ttctcgaact gaatcagttg ttctaccttt ggtagccagg attgtgcaga caccatatgc 120

tgcattaaat gcgtctaatt ctgaaggtgc tgattttctt atatatgttc atggcccaga 180

ggatgatcct gatgtagaaa tgagccctgg attcgggaat gtgaagatac caatctttgt 240

cctcaatgct tcacgtgggg aggacacatt gtcggtgggg gcatcaaaat ttctgaaaac 300

cggtgctagt ggtttagttc tgtcattgga agatttgagg ttatttagcg atgatgcttt 360

gagtcagatg tttgacactc tgagtgcaac cggtaaaaac tttcaggatg accttgaaag 420

cttcagtaag ctcaaatcta tggatatgga aaatgatatt catgaaaaaa caacggtggc 480

aggctttgtt aaactggagg atagagaaaa acagctcata g 521

<210> 206
<211> 324
<212> PRT
<213> Arabidopsis thaliana

<400> 206

Met Glu Ala Leu Ser His Val Gly Ile Gly Leu Ser Pro Phe Gln Leu
1 5 10 15

Cys Arg Leu Pro Pro Ala Thr Thr Lys Leu Arg Arg Ser His Asn Thr
20 25 30

Ser Thr Thr Ile Cys Ser Ala Ser Lys Trp Ala Asp Arg Leu Leu Ser
35 40 45

Asp Phe Asn Phe Thr Ser Asp Ser Ser Ser Ser Ser Phe Ala Thr Ala
50 55 60

Thr Thr Thr Ala Thr Leu Val Ser Leu Pro Pro Ser Ile Asp Arg Pro
65 70 75 80

Glu Arg His Val Pro Ile Pro Ile Asp Phe Tyr Gln Val Leu Gly Ala
85 90 95

Gln Thr His Phe Leu Thr Asp Gly Ile Arg Arg Ala Phe Glu Ala Arg
100 105 110

Val Ser Lys Pro Pro Gln Phe Gly Phe Ser Asp Asp Ala Leu Ile Ser
115 120 125

Arg Arg Gln Ile Leu Gln Ala Ala Cys Glu Thr Leu Ser Asn Pro Arg
130 135 140

Ser Arg Arg Glu Tyr Asn Glu Gly Leu Leu Asp Asp Glu Glu Ala Thr
145 150 155 160

Val Ile Thr Asp Val Pro Trp Asp Lys Val Pro Gly Ala Leu Cys Val
165 170 175

Leu Gln Glu Gly Gly Glu Thr Glu Ile Val Leu Arg Val Gly Glu Ala
180 185 190

Leu Leu Lys Glu Arg Leu Pro Lys Ser Phe Lys Gln Asp Val Val Leu
195 200 205

```
Val Met Ala Leu Ala Phe Leu Asp Val Ser Arg Asp Ala Met Ala Leu
    210                 215                 220

Asp Pro Pro Asp Phe Ile Thr Gly Tyr Glu Phe Val Glu Glu Ala Leu
225                 230                 235                 240

Lys Leu Leu Gln Glu Glu Gly Ala Ser Ser Leu Ala Pro Asp Leu Arg
                245                 250                 255

Ala Gln Ile Asp Glu Thr Leu Glu Glu Ile Thr Pro Arg Tyr Val Leu
            260                 265                 270

Glu Leu Leu Gly Leu Pro Leu Gly Asp Asp Tyr Ala Ala Lys Arg Leu
        275                 280                 285

Asn Gly Leu Ser Gly Val Arg Asn Ile Leu Trp Ser Val Gly Gly Gly
    290                 295                 300

Gly Ala Ser Ala Leu Val Gly Gly Leu Thr Arg Glu Lys Phe Met Asn
305                 310                 315                 320

Glu Ala Phe Leu
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<210> 207
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<220>
<221> misc_feature
<222> (2)..(3)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (5)..(5)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (7)..(7)
<223> Xaa can be any naturally occurring amino acid

<400> 207

Cys Xaa Xaa Cys Xaa Gly Xaa Gly
1 5

<210> 208
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<220>
<221> CDS
<222> (1)..(21)

<400> 208
gcg ttt tta tga atg aca gct 21
Ala Phe Leu Met Thr Ala
1 5